



ambition pour la biodiversité

**BIODEV
2030**



**BIODEV2030
GUYANA
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**FINAL REPORT
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A. Introduction: previous work

This final report is a continuation of **two previous works** (deliverable 1 and deliverable 2) to which it is advised to refer for a better understanding of the essay that follows.

- The first work, the **inception report**, details the BIODEV2030 project and its context. It presents the methodology of the first phase of the BIODEV2030 study, of which this final report is the result.
- The second work, entitled **report structure**, is a diagnosis of the sectoral drivers of biodiversity erosion in Guyana. It contains two main parts, an inventory of existing knowledge on biodiversity, referencing major ecosystems, their importance for **global biodiversity and their vulnerabilities** in Guyana's context (1) and a **diagnosis of existing sectoral threats** on those ecosystems, by exploring the impacts of 8 major economic sectors (2).

The previous work was based on an **extensive bibliographic and remote sensing analysis**, including scientific literature, official documentations, reports, laws and policies, and the press. Data were collected through internet research, consultation of documentation provided by project partners and by a group of researchers.

B. Methodology

B.1 Stakeholder consultation

Stakeholder consultation has been the core of the present report, which is the finalization of the study. Besides quantitative data (base of the previous work done), qualitative components have been key to sharp the analysis, as human decisions are the trigger of pressures on biodiversity.

- The consultation of stakeholders was divided into two stages:
- A **consultation by sending online questionnaires** to 88 stakeholders (private companies and trade unions, the second one to ministries, public institutions, group of researchers, environmental consultancies, NGOs, associations, foundations) to consolidate the diagnosis of the available data concerning the priority threatened ecosystems and drivers of biodiversity loss and potential drivers of change (annex 1). Out of the 88 stakeholders to whom the questionnaires were sent, and following several email reminders, 26 responses were received. Among them, 57.7% were part of public institutions, 19.2% were NGOs, 7.7% were private sector, 7.7% were academic or research, 7.7% were belonging to local communities and others.
- **8 workshops with key stakeholders** from the respective 8 main sectors. 183 invitations have been sent, out of which 80 people assisted (included the hosts, WWF team). Those workshops consisted in a participatory identification of the pressures and impact, current and futures, due to sector's activity (1) along with a workshop on the ability to mitigate or reverse the identified threats (2) and on the actor's willingness to defeat the identified threats (3). The series of questions and activities that were asked are available in annex 2. The answers are disseminated in the text.
- **One workshop with key stakeholders from the conservation sector**, aiming to pre-identify the priority sectors to work with. This meeting presented the results of the preliminary study (1), the results of the sectoral workshops (2), the criteria for prioritizing sectors (3) before attending a workshop on global impact/threats/reversibility/willingness at the level of all the sectors (4). The series of questions and activities that were asked are available in annex 3.
- Additionally, **some bilateral meetings** have been held with representatives of the oil and gas sectors, agricultural sector, and with researchers and experts, on the Guiana Shield in general (4 experts working in Biotope or affiliated), and wildlife and livelihood experts (SWM project).

B.2 Prioritization Criteria

To prioritize economic sectors within the BIDEV2030 study requirements, a set of criteria was developed. This set includes both qualitative and quantitative inputs that ultimately aim to assign an overall score to the economic sectors. This set of criteria is subdivided into three categories, respectively **impact, reversibility and willingness**, this triptych corresponding to the expectations of the biodev 2030 project insofar as it allows prioritizing the sectors according to **the intensity of their impact on biodiversity** (1), their **capacity to act *de facto* to mitigate this impact** (or at least to take it more into account) (2), and their **capacity to act intentionally to mitigate this impact** (the aim of the study being to create voluntary and concerted commitments on the part of the economic sectors) (3)

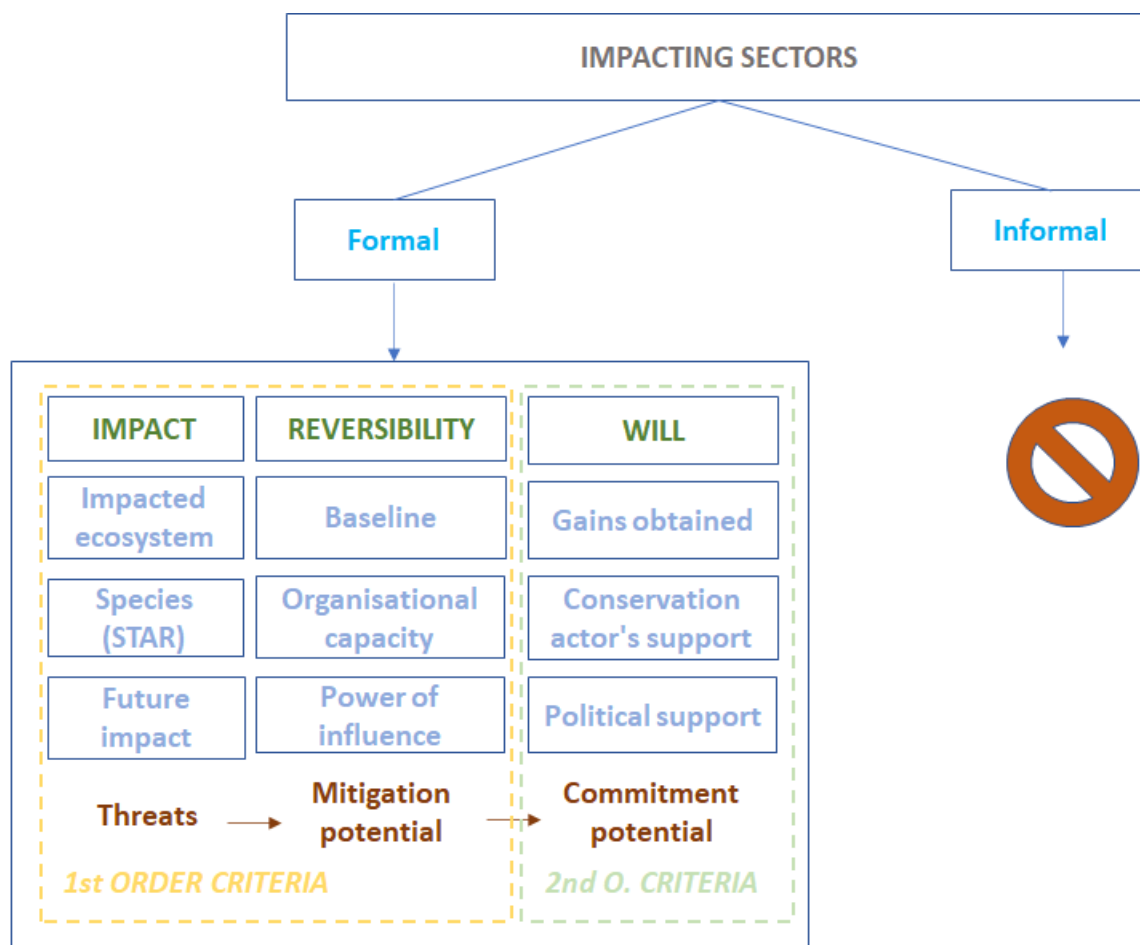


Figure 1. Subdivision of prioritisation criteria, Source : Manon Bourey, Seon Hamer

For each of the **23 criteria**, a scoring system has been developed. Scores from 0 to 4 were assigned to all sectors studied for each criterion, the assignment being the results of bibliographic and remote sensing analysis, multi stakeholder consultations, and expert appreciations. The final and detailed table (ranking method included) is available in annex 4.

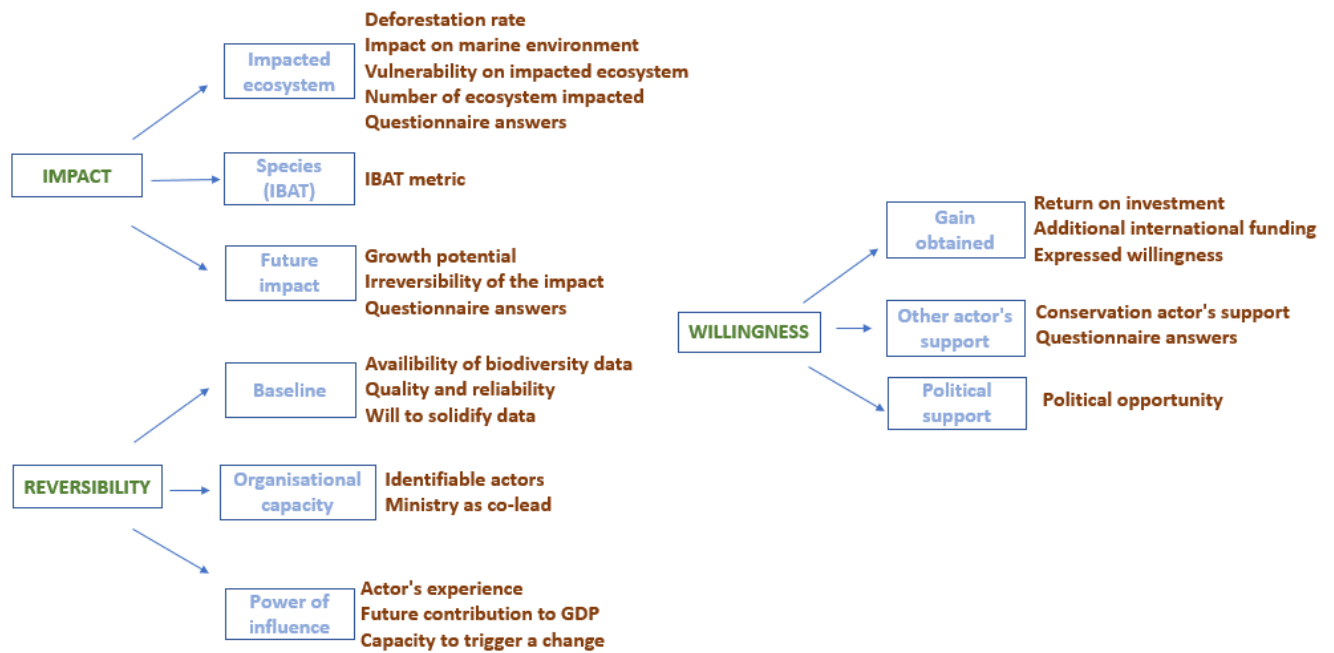


Figure 2. 23 criteria of the prioritization process. Source : Manon Bourey, Seon Hamer

Impact Criteria

The first set of criteria aim to measure **the intensity of the impact** of economic sectors on biodiversity (1) and is subdivided into three main parts concerning the habitat (impacted ecosystems), species (the STAR metric) and future impact.

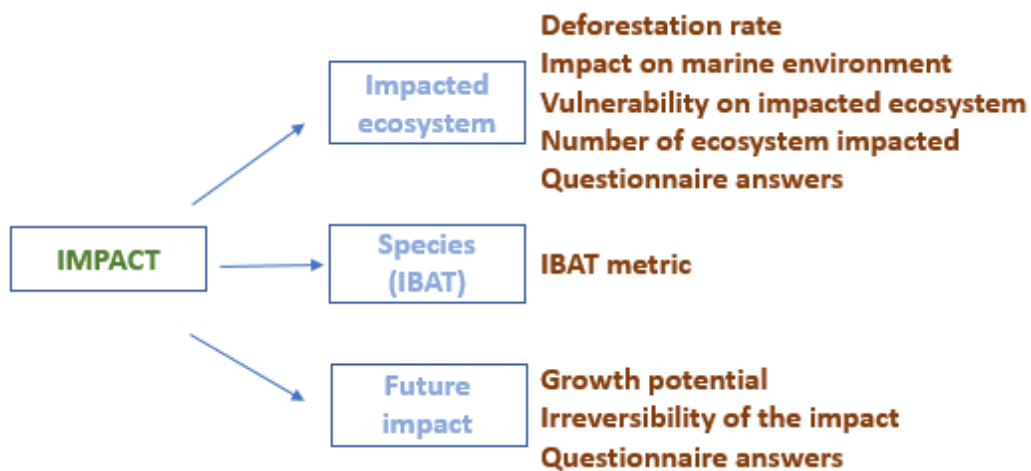


Figure 3. Impacts criteria. Source : Manon Bourey, Seon Hamer

With regard to habitat, the **deforestation rate** is well known in Guyana (MRVS Report Assessment 2019; GFC, 2020); the impact on **marine environment** has been valued according to the preliminary study (Report Structure, deliverable 2), expert assessment and multistakeholder workshops; the **number of ecosystems impacted** is the result of the preliminary study (Report Structure, deliverable 2) and multistakeholder workshops ; the **questionnaire answers** are the results of the sent questionnaire. The **level of vulnerability** of ecosystem impacted have been associated with 8 criteria:

- Their respective **level of protection**, being the result of the protected area network, the accessibility of the ecosystems and the existence 'of community-based ressource management regime.
- The **anthropic pressure**, being the results of the remote sensing analysis proposed by the GEF (Gassert et al. 2014) showing the ecosystem services usage according to population density.
- The **landscape integrity index**, which describes the degree of anthropogenic forest modification, being the work of a collaboration between 47 forest experts (Grantham et al., 2020)
- **Threatened species richness**, published by the GEF, based on the work of Jones et al. 2018.
- **Endemicity**, measured as species' range rarity through the IUCN Red List.
- **Least carbon storage**, both in aboveground biomass and soil organic carbon, measured by Zomer et al. (2018), published by the GEF.
- **Biodiversity intactness**, measured through the degradation within ecoregions by Dinerstein et al, published by the GEF.
- **Forest cover loss** (2000-2017), measured by Hansen et al., published by the GEF.

MOST VULNERABLE ECOSYSTEM							
No specific protection	High anthropic pressure	Lowest landscape integrity index	Threatened species richness	Most endemicity	Least carbon storage (soils & aboveground)	Least biodiversity intactness	Forest cover loss (2000-2017)
<i>Report structure analysis</i>	<i>Gassert et al., 2014</i>	<i>Grantham et al., 2020</i>	<i>Jones et al. 2018</i>	<i>Flanders marine institute, 2018: Cole et al., 2012</i>	<i>Zomer et al., 2018</i>	<i>Dinerstein et al., 2017</i>	<i>Hansen et al., 2013</i>
White sand plateau	Coastal	Coastal	Forests	Montane forests	Coastal	Savannahs	Coastal
Marine	Savannahs	Freshwater	Marine	Coastal	White sand plateau	Coastal	Savannahs
Freshwater	White sand plateau	Savannahs		Freshwater	Freshwater		White sand plateau
	Link 1	Link 2	Link 3	Link 4	Link 5	Link 6	Link 7
Coastal	6						
White sand plateau	4						
Savannahs	4						
Freshwater	4						
Marine	2						
Forest	1						
Montane Forest	1						

Tableau 1. Identification of the most vulnerable ecosystems. Source : Manon Bourey, Seon Hamer

Regarding species, the assessment have been the result of the **IBAT metric**, which estimates the contribution that an investment can make over a geographic area to reduce the risk of species extinction by reducing existing risks (mitigation potential). This measure lists **the threats to species at risk (VU, EN, CR), which has the best mitigation potential**, and are the following in Guyana:

- Fishing & harvesting aquatic resources, on a large extent, category (5.4.)
- Logging and wood harvesting (5.3.)
- Housing and urban areas (1.1)
- Agro-industry farming (2.1.3.)
- Mining and quarrying (3.2)
- Agro-industry grazing, ranching or farming (2.3.3.)
- Hunting & collecting terrestrial animals (5.1.1.)

For future impacts, the **growth potential** have been evaluated through bibliography analysis (scientific and officials) of future trends for Guyana and multi-stakeholder meetings; the **irreversibility of the impact** have been assess through expert assessments and multistakeholder meetings; the **questionnaire answers** are the result of the questionnaire sent.

Reversibility Criteria

The second set of criteria aimed to measure **capacity to act de facto to mitigate this impact** (or at least to take it more into account) (2) and is subdivided into three main parts concerning the possibility to create a baseline (anticipation of the feasibility of monitoring & evaluation activities), the organisational capacity and the power of influence.

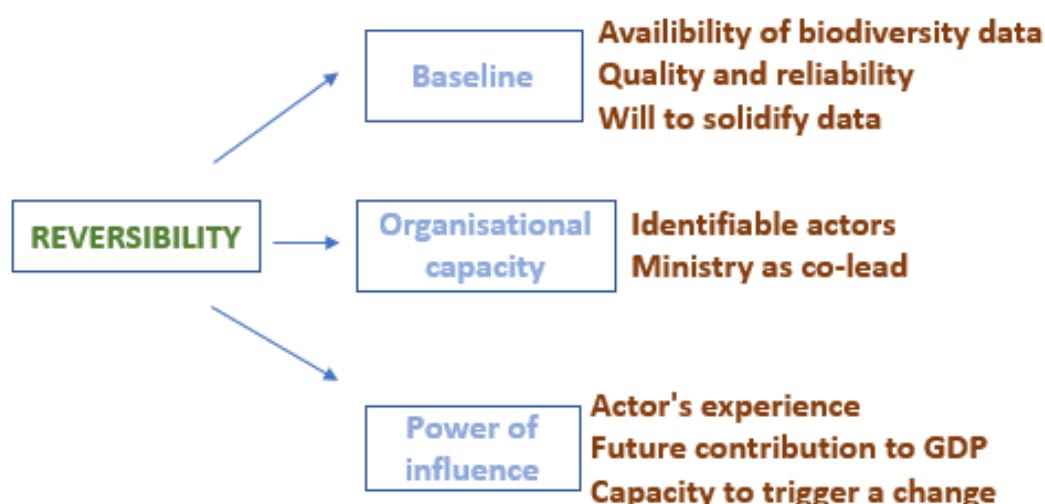


Figure 4. Reversibility criterias. Source : Manon Bourey, Seon Hamer

For the baseline, the ranking was set according to the **availability of biodiversity** data, the **quality and reliability of data obtained** and the **will to solidify data**, which are all the result of bibliographic analysis, consultation with the university of Guyana, and meeting with conservation actors.

Regarding the organizational capacity, an analysis of **identifiable actors** was made (unions, research, TFPs, businesses, etc.), a score was given according to the diversity of its actors or groups of economic actors, the attendance of invitees at sectoral meeting (annex 5) and the opinion of conservation actors. The second criteria selected was the **capacity of the sectoral ministry to co-lead** the creation of voluntary commitments, which ability and will to facilitate stakeholder mobilization and commitment within the sector have been assessed through bibliographic review, assessment and opinion of conservation actors, researchers, and sectoral actors.

For the power of influence, various criteria were considered: the actors' **experience in making relevant and voluntary commitments**, which have been assessed through bibliographic review and opinion of conservation's actors; the sector's future **contribution to GDP**, which is officially published (World Bank,

Inter-American Development Bank) and sectoral growth prospective reports. We also attributed the maximum score at the banking sector, which is inherently the main contributor to economic projects; the sector's **capacity to trigger a change** for other impactful sectors, which has been assessed through bibliographic research, expert statement, multi-stakeholders meeting, and meeting with conservation actors.

Willingness Criteria

The last set of criteria aimed to measure the **capacity to act intentionally to mitigate this impact** (the aim of the study being to create voluntary and concerted commitments on the part of the economic sectors) and is subdivided into three main part : the **gain obtained**, the other **actor's support** and the **political support**.

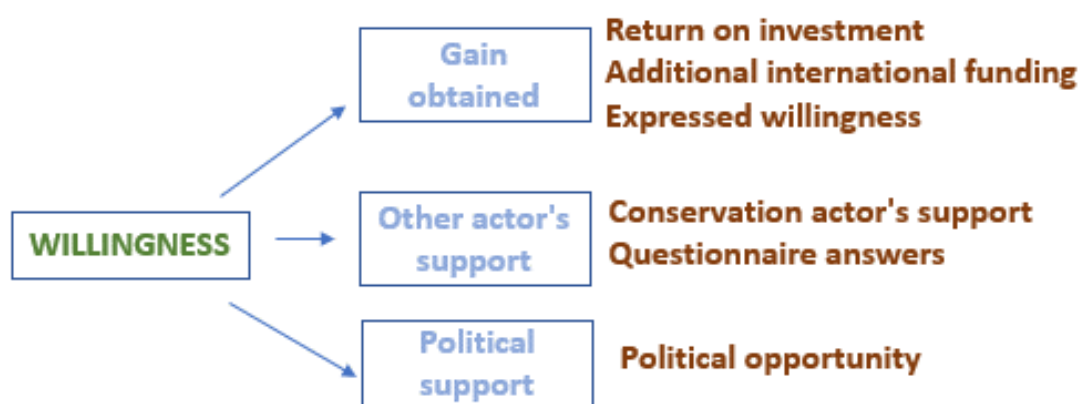


Figure 5. Willingness criterias. Source : Manon Bourey, Seon Hamer

The gain obtained have been assessed according to the **return on investment** one sector could earn by enhancing biodiversity mainstreaming in its regular activities. The assessment is the result of the conservation actor's workshop along with expert assesment and results from the stakeholder meetings. On those same modalities, an assessment has been made in terms of **image gain and additional international funding earnings**. As regards the **expressed willingness**, it has been assesed according to the number of comittments proposed during the workshops, and an additional point has been attributed to sectors being assesed as willing to engage according to conservation actors.

The **other actors' support** is the result of the direct appreciation of conservation actors' and the questionnaire answers.

The political support was assessed according to **available political opportunities** in Guyana, which are the current trends at the national level which are the followings :

Mining	The National initiative for responsible mining, an enabling framework for biodiversity mainstreaming and mercury reduction in small-scale gold mining operations	Climate Resilience Strategy and action Plan (CRSAP)	Low Carbon Development Strategy (LCDS)
Agriculture	The Climate Smart Agriculture (CSA) Initiative		
Forestry	REDD+, EU-FLEGT		
Fisheries	Strategic Framework and Management Plan for Artisanal Fisheries		
	Fishery Management Plan		
Renewable Energies	Hinterland Electrification Programme (HEP)		
Tourism			
Oil and Gas Sector	None		
Banking sector	None		

Tableau 2. National political initiatives to adress ecosystem degradation

C. Results: Identification of priority sectors

C.1 Results of the questionnaire

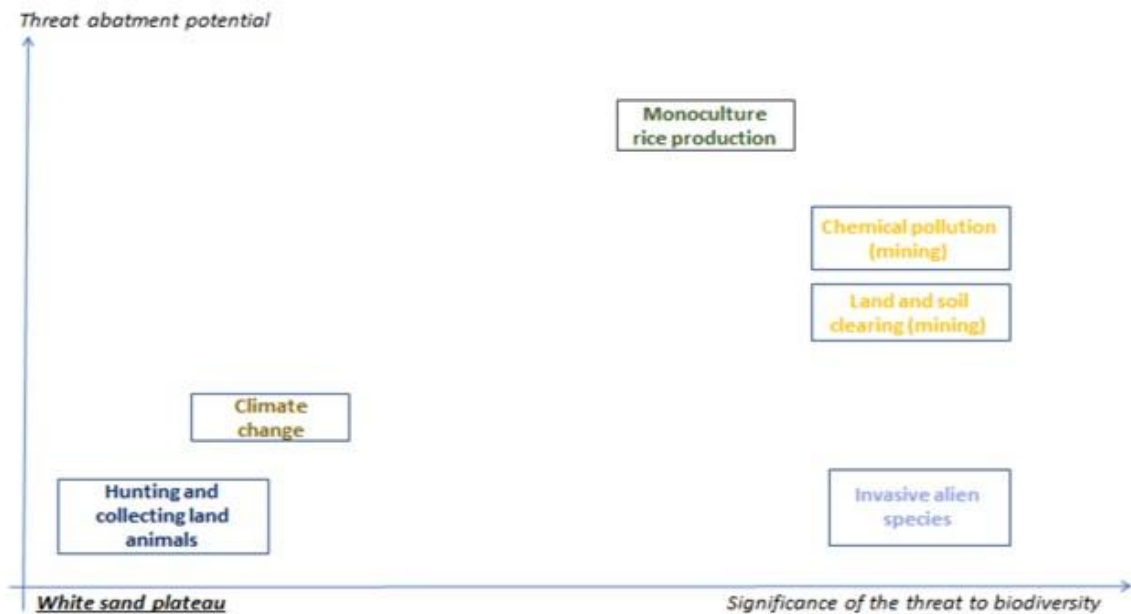
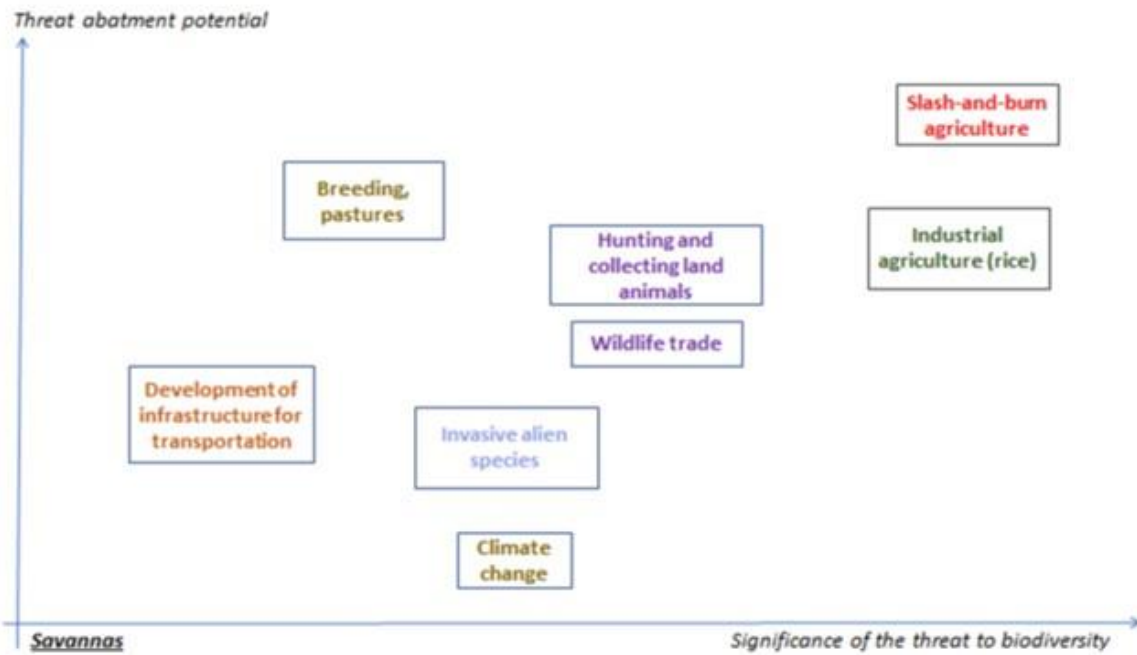
A questionnaire has been sent to a large group of public and private actors and the main output were the following.

Regarding ecosystems impacted, the coastal plain (63.2%), the forests (68.4%) and wetlands (31.6%) were assessed to be priority in terms of conservation needs. Forests (78.9%), coastal plain (42.1%), freshwaters (36.8%) and marine ecosystem (36.8%) has been assessed as the most threatened by human activities, and on the opposite side, savannahs (72.2%) and wetlands (44.4%) has been assessed as the less impacted by human activities.

The exercise was also based on a multicriteria assessment, and according to this approach, it happened that the most vulnerable ecosystems are the coastal ecosystem, the white sand plateau, and the savannahs. However, it is important to notice that the vulnerability of freshwaters and marine ecosystems might not realistically be highlighted in this assessment as most of criteria doesn't include those ecosystems (landscape integrity, carbon storage soil & above ground, forest cover loss).

The preliminary analysis proposed in the **Report Structure**, highlighted the impacting sectors on those ecosystems, and they were the followings:

- **Mining activities** : white sand plateau, waters system, coastal (3)
- **Agriculture** : coastal, savannahs, waters system (3)
- **Renewable energies**: waters system, coastal (2)
- **Oil and gas** : coastal (1)



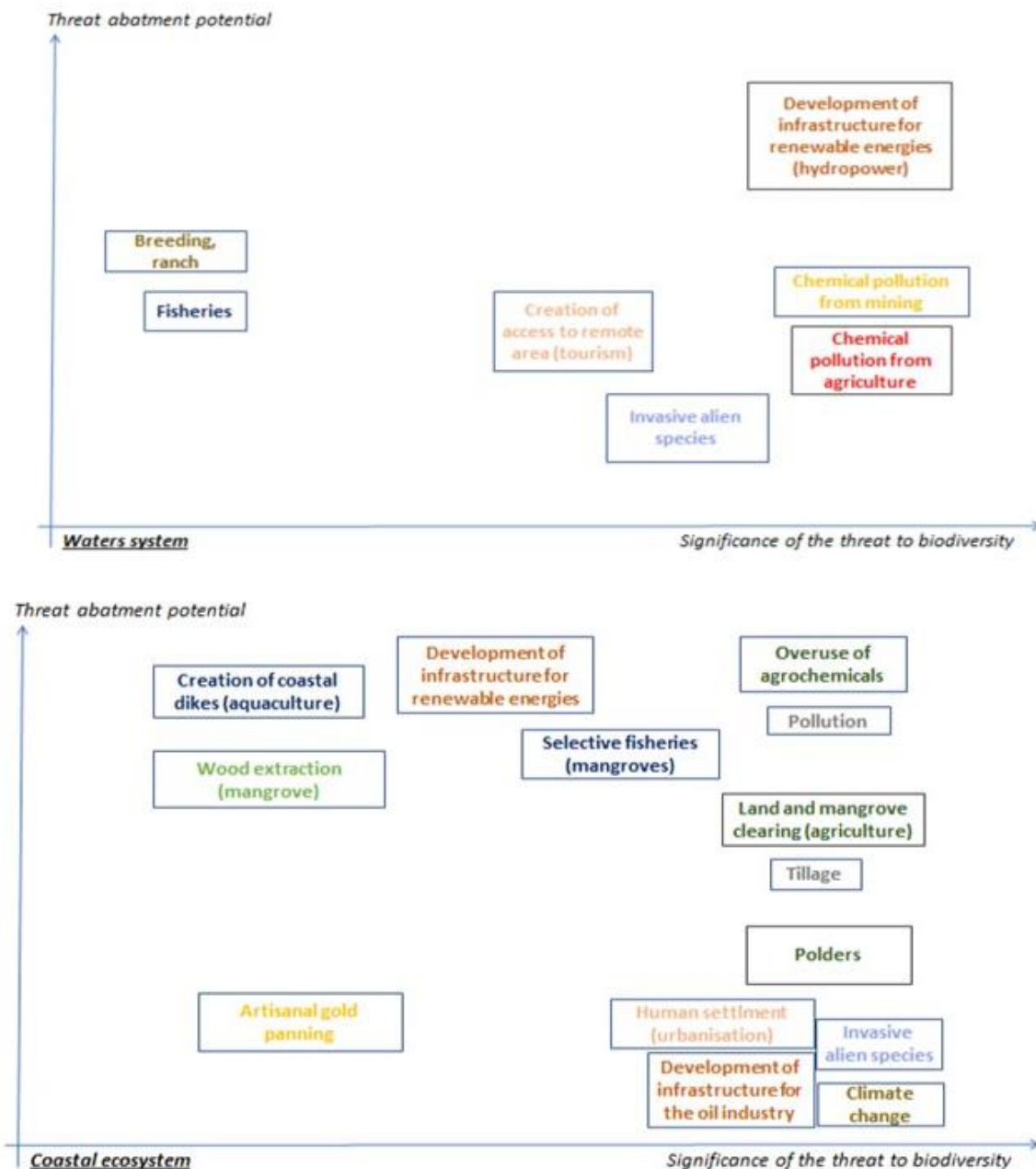


Figure 6. Impacting sectors on vulnerable ecosystems. Source : Authors in the Report Structure (deliverable 2).

Those results corresponds to the assessment for **criteria 1.3**.

The questionnaire respondents also assessed that industrial **agriculture** is the main factor causing the degradation on four ecosystems, **oil and gas** on three ecosystems, **forestry + NTFP** on three ecosystems, **mining** on two ecosystems, **fisheries** on two ecosystems as follows:

On the coastal plain, the main factors of degradation are :

- **Oil and gas** (indirect and direct effects)

So far for this sector, since the discovery of oil in 2015 in the Guyana Basin, Exxon and its partners have only been involved in upstream activity which involves only **exploration and production** (OilNow, 2020). All of the production activities are carried out **offshore but are supplied from Guyana coast** where there are a few shore bases that provide goods and services to the industry. Guyana's coast has thus far been suffering from the **indirect effects** of the sector so far. The more the sector develops, there will be an increased need for goods and services to be supplied to the offshore operations. So, there will be a need for the construction of additional shorebases which will see extensive acreages of mangroves and other related vegetation being permanently destroyed.

As of late, there have been **controversy as it relates to the construction of shore bases along Guyana's Coast**. The ministry of public works has already approved the construction of **eight shorebases** to provide services to the oil fields offshore (OilNow, 2021). All of these shorebases are to be constructed in areas where mangroves will have to be permanently cleared away. On average, an at least 20 acres of mangroves will have to be cleared to accommodate the construction of each base. However, what would have to be considered is the scale and type of services that will be offered, and this will determine the size of the base. Since one of the goals of the oil and gas sector will be to **increase production to 1 million barrels per days in early 2022**, the proposed shorebases would have to be very large (Policy Forum Guyana, 2021; Stabroek News, 2021).



Figure 7. Mangrove destruction as a result of proposed shorebase construction. Source: Stabroek News.

Other impacts on the coastal plain besides mangrove deforestation that would have to be considered are:

- **Soil degradation and contamination** due to discharge and spillage of fuel and other chemicals that might be used at the shorebase to conduct everyday activities
- **Mangrove deforestation** would mean that there will be a loss of biodiversity habitats. This also has the potential to disrupt migratory species which also depend on the mangroves for protective or reproductive cover
- The most important ecosystem service that Guyana's coast benefits from is **coastal protection** from erosion, floods caused by storm surges, irregular high tides, spring tides, etc. which can lead to saline intrusion

- Industrial agriculture (rice)

For many years, rice cultivation has caused extensive ecological disturbances and degradation. The industry is heavily dependent on **agrochemicals such as pesticides, herbicides and fertilizers** (GoG, 2016). In recent, there has been an increased use of pesticides which is the results of a paddy bug infestation which significantly affects rice paddy production (Guyana Times, 2021; Stabroek News, 2020).



Figure 8. Paddy bug infestation of a rice field on the Essequibo Coast of Guyana (Pomeroon-Supenaam Region). (Source: Beaufort Adams).

The closeup below, shows the densely populated paddy bug colonies in the rice field. The **runoff from the rice fields is laden with high concentrations of agrochemicals** that are discharged from the rice fields and end up in the **waterways causing contamination** (Armand, 1998; Khai & Yabe, 2013). However, there are no studies in Guyana that were conducted to verify the level of contamination caused by rice cultivation activities.



Coastal Plain (including mangrove forests)

Fisheries (Artisanal)	Industrial Agriculture (Sugar)	NTP Extraction	Mining (Direct Effects)
Fisheries (Industrial)	Industrial Agriculture (Others)	Oil & Gas (Direct Effects)	Mining (Indirect Effects)
Tourism	Infrastructure for Renewable Energy	Oil & Gas (Indirect Effects)	Timber (Direct Effects)
Banking Sector	Others	Industrial Agriculture (Rice)	Timber (Indirect Effects)

Figure 9. Results of the questionnaire : impacting sectors on coastal plain.

On forests, the main factors of degradation are :

- Timber (direct effects)

The timber industry has directly affected Guyana's forests for a very long time. Originally when the timber industry started in the colonial era, conventional forest practices were widespread and had negative effects on the forests. **Greenheart (*Chlorocardium rodiei*)** which is endemic to Guyana and its natural range being the Bartica Triangle was the most sought-after species because of its very good engineering properties and the logs were exported to the United Kingdom in large numbers. The conventional practice in time took its toll on the greenheart stands and the surrounding forest since **conventional logging was very destructive** causing habitat loss and fragmentation, increased turbidity in waterways, erosion because of exposure from deforestation, etc. With the implementation of the **Reduced Impact Logging (RIL)**, the damage cause by logging activities were reduced but there was still a significant amount of negative ecological effects (Hout, 2016; van der Hout, 2000).

- Mining (direct effects)

Mining is classified and the **number one cause of deforestation** in Guyana. Over the year with the development of the mining sector, large swaths of forests and habitats have been lost with the **deforestation rate peaking in 2012**. Other ecological effects that have been experienced in Guyana due to mining are (Dillard, 2012; Guyana Chronicle, 2016; Roopnarine, 20202; Singh et al., 2013):

- **Contamination of the freshwater ecosystem** due to unauthorized discharge of tailings into waterways in some cases. However, there were instances where there were accidental discharges causing disasters such as the Omai Cyanide Spill in 1995
- Increasing the risk of erosion and landslides
- **Removal of the fertile topsoil** which hinders natural regeneration

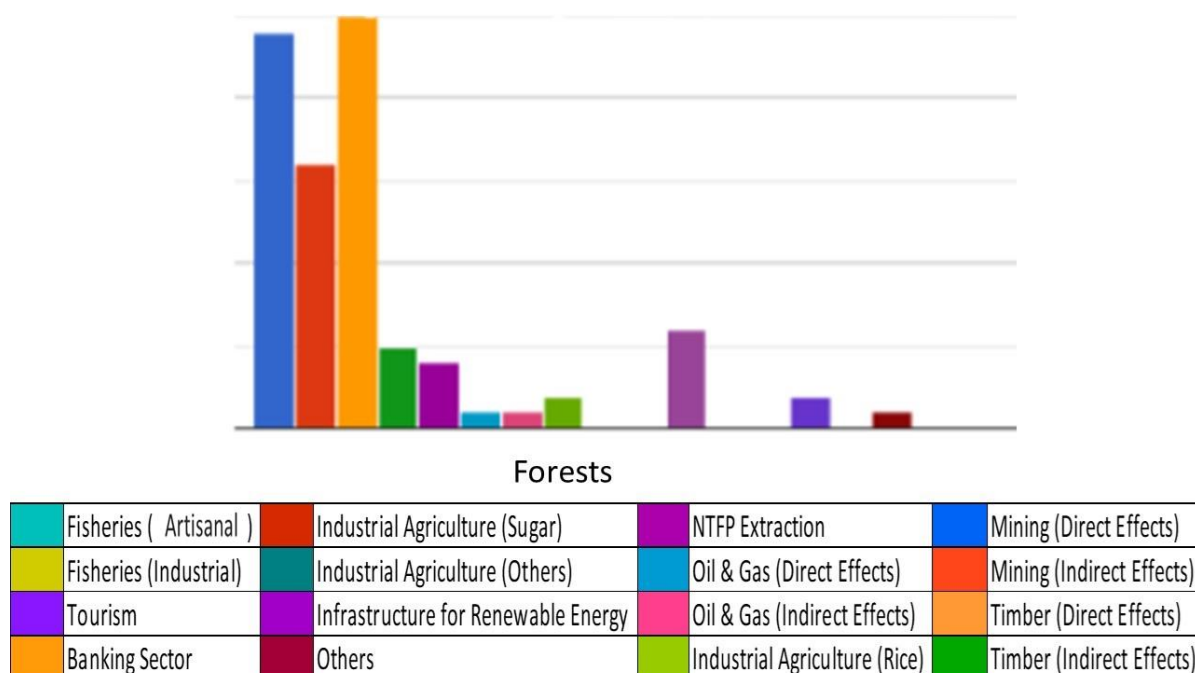


Figure 10. Results of the questionnaire : impacting sectors on forests.

On wetlands, the main factors of degradation are :

- Industrial agriculture (rice and others)

The impacts of Guyana's industrial agriculture on wetlands may have two characteristics that we have to consider although no studies have been conducted to confirm.

First, because of the **encroachment of agriculture into the wetlands**, the area of the wetlands may have been significantly reduced over the years due to reclamation for agricultural activity which automatically means a reduction in habitats for species that directly depend on wetlands. Any remaining wetlands have since been **fragmented looking at the issue from a landscape perspective**. This encroachment and reclamation was started by the Dutch who first colonized Guyana in the 1600s. The dominant crops cultivated on an industrial scale was first sugarcane around 1658 and later rice in 1738 by the then Dutch Governor of Essequibo (Laurens Storm van Gravesande) introduced the crop as a means of supplementing the diet of slave labourers working on sugarcane estates. Other crops such as cotton later followed which required significant irrigation (GBTI, 2020a, 2020b).

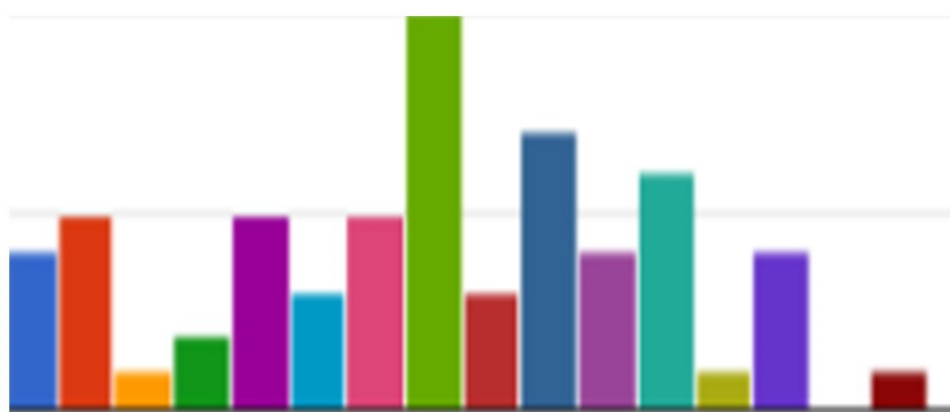
Secondly, due to wetland reclamation for agricultural activity, there may be a high probability that the **ecological functions of the remaining wetlands have been significantly reduced over time**. The environmental flow of the wetlands are either cut or significantly reduced over the years in an attempt to strengthen the agricultural irrigation systems in order to make the activity less susceptible to drought events that are occurring more and more in recent years.

The remaining remnants of the wetlands that were modified and empoldered over the years in Guyana to strengthen the agricultural system are the East Demerara Conservancy, the West Demerara/ Boeraserie Conservancy, etc.



Figure 11. Concentration of agricultural activity. Source : Global Wetlands v3 (<https://www2.cifor.org/global-wetlands/>) and Google Earth.

The map shows northeast of Guyana where most of the agricultural activity in the country is concentrated. The red shaded area are the present day extent of the wetlands overlaid on the original extent of the different categories of wetlands.



Wetlands

Fisheries (Artisanal)	Industrial Agriculture (Sugar)	NTFP Extraction	Mining (Direct Effects)
Fisheries (Industrial)	Industrial Agriculture (Others)	Oil & Gas (Direct Effects)	Mining (Indirect Effects)
Tourism	Infrastructure for Renewable Energy	Oil & Gas (Indirect Effects)	Timber (Direct Effects)
Banking Sector	Others	Industrial Agriculture (Rice)	Timber (Indirect Effects)

Figure 12. Results of the questionnaire : impacting sectors on wetlands.

On savannahs, the main factors of degradation are :

- Industrial agriculture (rice and others)

The intermediate savannahs of Guyana has seen a number of agricultural trails with different crop in early years. Although the intermediate savannahs haven't seen a significant ecological impact as a result of industrial agriculture over the years, the **threat of significant ecological impacts from industrial agriculture is ever increasing** and real. **Crops** that were planted in the intermediate savannahs never went past trails over a period of 20 year which identified soya beans, citrus, peanuts, etc. **Livestock trials** have also been successful (DPI, 2018; Guyana Chronicle, 2017).

The area is regarded as a new agricultural frontier and covers an estimated 270,000 hectares comprising of 70% forest and 25% savannah lands. There are five (5) distinct areas; the Kimbia/Ebini Savannah (East of the Berbice River); the Wiruni Savannah (West of the Berbice River); the Ituni/Tacama Savannah (West of the Berbice River); the Kibilibiri Savannah (West of the Berbice River) and the Eberoabo Savannah (West of the Berbice River) (Guyana Chronicle, 2017).

Future potential ecological impacts include:

- **Deforestation** which can be because of the establishment of pastures for livestock and various crops such as soya bean which has been found to cause extensive ecological damages although new cultivation techniques have lowered the rate of ecological damage or disturbance, however, it is still considered an ecologically unsustainable crop.
- **Potential eutrophication or contamination** of both the surface and groundwater resources as a result of the use of agrochemicals which will be needed to maintain the production of such a large agroecosystem
- **Erosion and loss of topsoil** due to land preparation activities

The **Rupununi Savannahs has been under instensive extensive livestock raring systems** for several years and used to be the center of livestock production in Guyana (mainly cattle). However, since the early 1980s, livestock herds have since decreased and the region with the largest livestock herds is now

Region 5. However, there may have been significant ecological disturbance and change in the Rupununi Savannahs but **no assessments or studies have conducted to confirm such**. However, assessments and studies were carried out in the neighbouring Brazilian Savannahs which found that the Cerrado had **increased terrestrial acidification and freshwater ecotoxicity**. The Pantanal exhibited impacts such as freshwater ecotoxicity, water depletion, freshwater eutrophication and photochemical oxidants formation all a result of industrial livestock production (Carvalho et al., 2020; Cohn et al., 2014; Dick et al., 2021).

- NTFP extraction

NTFP extraction has some level of cumulative effects on the savannah ecosystem but some more than others. The wildlife trade has particularly had an impact due to the reduction in the population of various species over the years which was previously under-regulated.

For example, in Saint Cuthbert's Mission (Pakuri) which is located in the savannah ecosystem of Region 4, there were vast stands of ite palm (*Mauritia flexuosa*) from which one of the main NTFPs, tibusiri, is harvest and used to make craft such as mats, baskets, etc. Initially the tibusiri was harvested manually by chopping down the tree to get the spire where the tibusiri fibres are found. Manual harvesting limited the number of trees that could be harvested to a number that was sustainable at the time. As the year progressed, the demand for tibusiri craft went up and the chainsaw came to Guyana, and this provided the opportunity for increased income. In trying to satisfy demand, harvesters started to use chainsaws in the harvesting process which made the work easier and more trees could be felled. After a period of time the vast ite palm stands that were scattered throughout the savannah eventually started to decline and almost disappear leaving a few scattered small clumps. The fauna that were hunted for food, mainly the Tapir (*Tapirus terrestris*), were also dependent on the ite palm as a food source and when the ite stands disappeared, game populations also declined and now hunter have to travel long distances for game (Clenkian, 2017).

- Tourism

In recent years, tourism have become popular in the Rupununi Savannah due to a drive by the Government of Guyana to further development nature and **adventure-based tourism** since tourism is the third largest contributor to Guyana's GDP. There might be impact such as **contamination from waste** that is generated by tourists, **vegetation destruction and degradation, disturbance and alteration of wildlife** behaviour due to noise and the presence of tourists, soil disturbance and degradation, etc. There haven't been studies conduction in the Savannah ecosystem of Guyana to assessment the impacts of tourism but there have been similar impacts documented in other countries that have tourism in similar ecological zones (Prager & Milhorance, 2018; Ros-Tonen & Werneck, 2009).

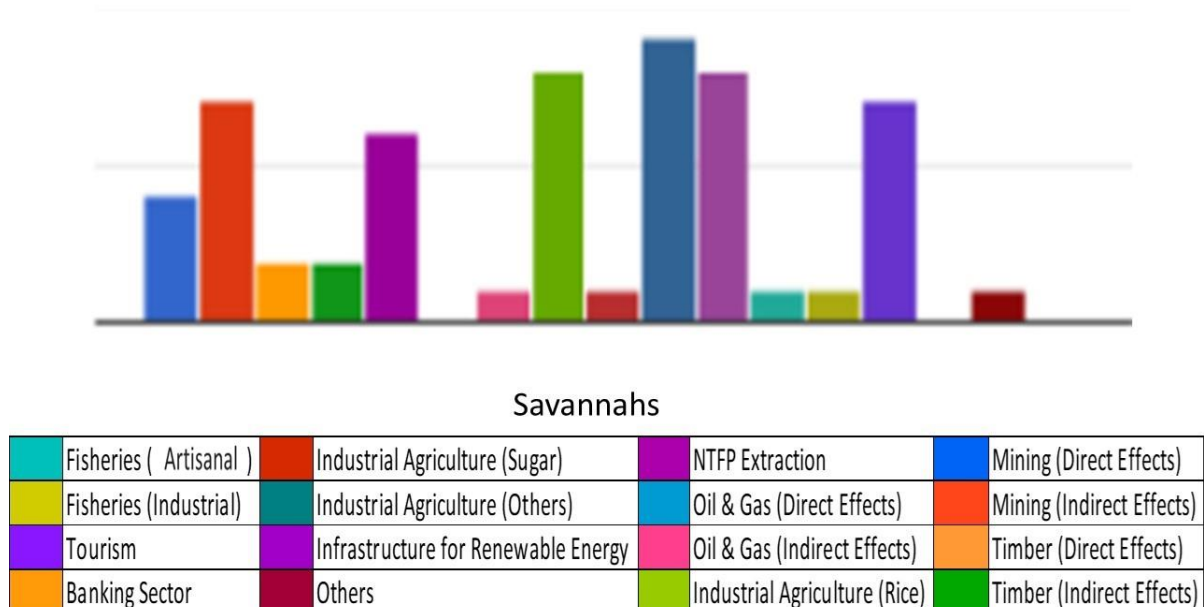


Figure 13. Results of the questionnaire : impacting sectors on savannahs.

On freshwaters, the main factors of degradation are :

- Mining (direct and indirect effects), for a great majority

Mining has been having significant negative impacts on the **freshwater ecosystem** for many years in Guyana. The most blamed form of mining being gold mining which on many occasions has resulted in **increased turbidity and mercury contamination of the freshwater ecosystem** in Guyana (usually resulting in **bioaccumulation** throughout the various trophic level in some areas). The ecological impacts stemming from gold mining is usually the result of **non-compliance to mining regulation** which is enforced by the Guyana Geology and Mines Commission (GGMC) in the various mining districts. River dredging is especially impactful causing significant increases in turbidity from dredge discharge and erosion of riverbanks. **River dredging** also destroys or changes their natural state of the riverbed which alters the aquatic ecosystem which negatively affects aquatic biodiversity (Guyana Chronicle, 2016; Roopnarine, 2002).

In the hilly, sand and clay region, sand and bauxite mining are dominant. **Sand and bauxite mining** also (Papannah, 2020) cause negative impacts on surface and groundwater resources in the form of increased suspended solids in the water and the elevation of the concentration of various heavy metals (Al, Cd, Co, Cr, Cu, Fe, Mn, Pb, Sr, Zn) in both surface and groundwater resources. With regard to sand mining, attention has to be paid to interaction with the **groundwater resource** since in many cases the water table is exposed (Joaquin, 2017; Kusin et al., 2018).

- Industrial agriculture (rice)

The rice industry in recent time have been seeing the need for increased use of pesticides due to **infestation by various pests, increased fertilizer** used in an attempt to bring the soil to an optimal level of fertility to maintain optimal production levels and herbicidal use to eliminate competition of the rice crop with weeds despite the development of new and improved rice varieties (GRDB 15 variety introduced in 2018 and GRDB 16 introduced in 2020). The agrochemical residues end up in the **waterways via discharge** from the rice fields causing **aquatic contamination**.

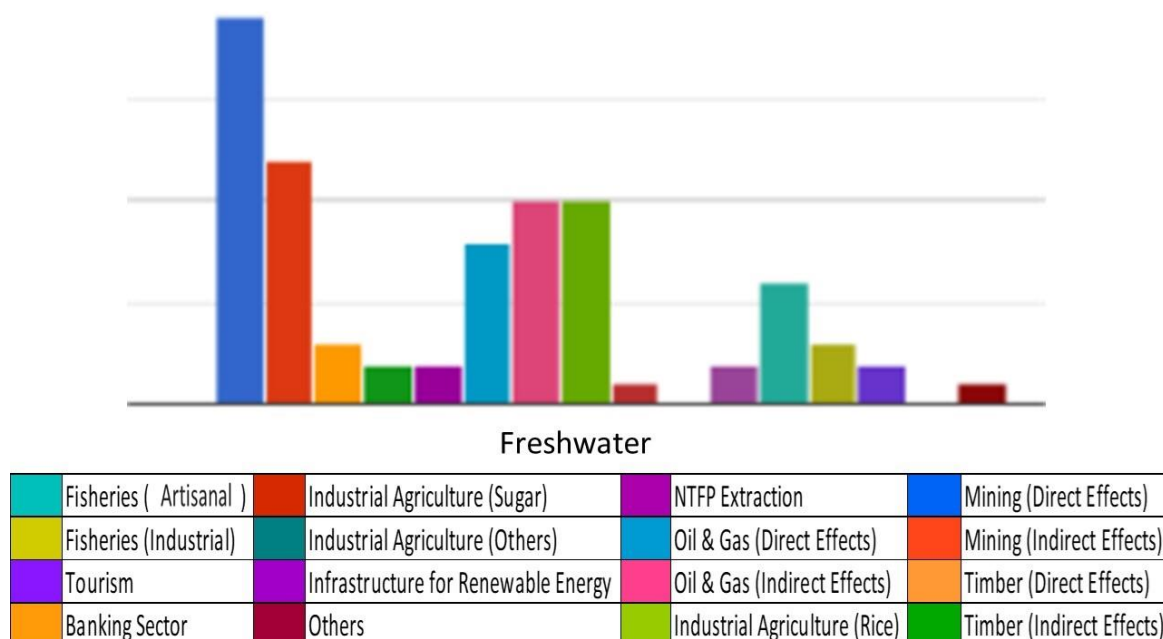


Figure 14. Results of the questionnaire : impacting sectors on freshwaters.

- Oil and gas (direct and indirect effects)

This sector appeared as the third result of the questionnaire, but as it is still very young, no impact has been seen yet in the freshwater ecosystem due to oil and gas production since all the activities happen offshore. We would then advise to focus on the two first results.

On marine ecosystem, the 3 main factors of degradation are :

- Oil and gas (direct and indirect effects), for a great majority

The impacts of the oil and gas sector in Guyana have not yet been formally assessed but the environmental impacts assessments conducted by ExxonMobil Guyana outline potential impacts such as **sonar disturbance** from the noise generated by the equipment used in the operation which can be detrimental to a number of species, especially mammalian species that use sonar. There is also a potential risk of an **oil spill** which can cause marine contamination and massive die-off of wildlife (both macro and micro flora and fauna) and depending on the magnitude of the spill, will reach the upper north west shore of Guyana (Shell beach Protected Area) which is considered to be a very important habitat (CI, n.d., 2018, 2019, 2020; ERM et al., 2020).

- Fisheries (industrial)

Fish populations in Guyana's **exclusive economic zone (EEZ) is on the decline** and fisherfolk have confirmed as recently as 2021 that they need to expend more effort and resources to maintain the same **catch level** from 10 years ago. Guyana's EEZ have been intensively fished for decades and coupled with other economic activities that is carried out in the EEZ will eventually lead to a total collapse of the fishery stock (Guyana Standard, 2020; Kaieteur News, 2021).

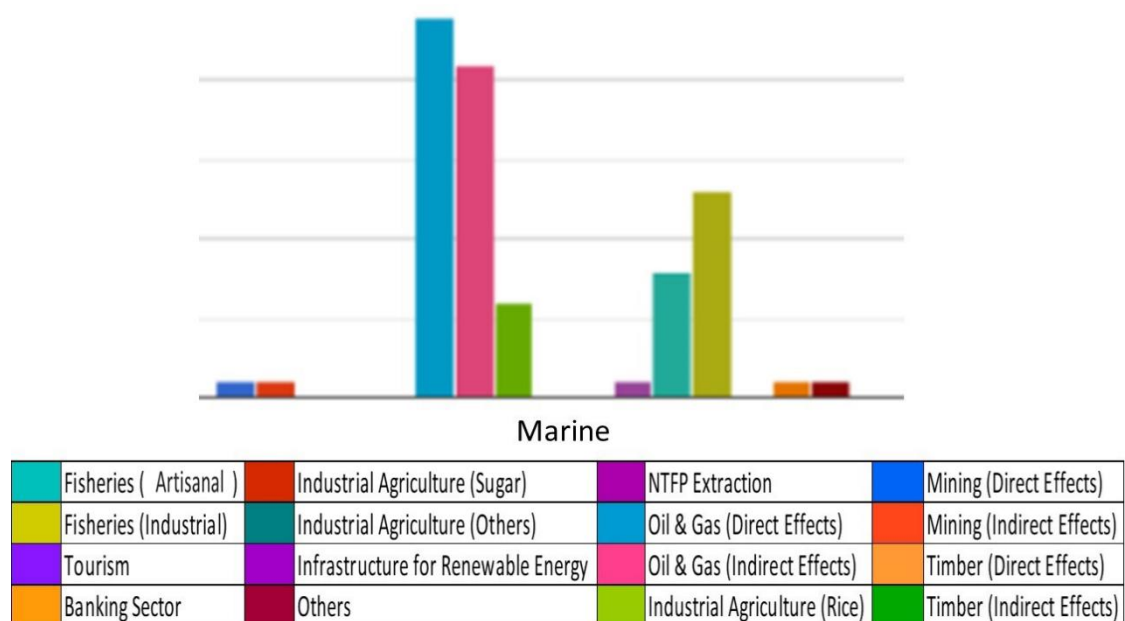


Figure 15. Results of the questionnaire : impacting sectors on marine ecosystem.

As a result of the Report Structure, the economic sectors that impacted most ecosystems were the **mining sector, followed by the agricultural sector**. As this “number of ecosystem impacted” isn’t ponderate by the intensity of the threat, it has been decided, for the **criteria 1.4** to add 2 point to the ecosystem that

are the main factors of degradation on 3 or more ecosystems, and 1 point for those being the main factor of degradation on 2 or less ecosystems.

Just to notice, the white sand plateau hasn't been proposed as a targeted ecosystem in the questionnaire (request from the client), and this could introduce a bias. If it was the case, mining might have had an additional point as it is the main factor of degradation on the white sand plateau (sand mining is very prevalent in the white sand plateau).

NUMBER OF ECOSYSTEM IMPACTED							
Mining	Agriculture	Forestry	Oil and Gas	Fisheries	Renewable energies	Tourism	Banking sector
5+1 = 6	4 + 2 = 6	2+1 = 3	2+2 = 4	2+1 = 3	2	2	0

For the impactful sectors, mining (94.7%), timber and non-timber forest products extraction (73.7%) and industrial agriculture (47.4%), followed by oil and gas sector (36.8%), fisheries and aquaculture (31.6%) have been considered as the actual most responsible sectors for biodiversity loss in Guyana. The oil and gas sector (89.5%), the mining sector (84.2%) and the timber and non-timber forest product extraction (63.2%) followed by renewable energies (31.6%) have been assessed as the future most responsible sectors for biodiversity loss. **Those answers corresponds to the assessment for the criteria 1.6 and 3.3.**

For the assessment of sectors' willingness, according to the questionnaire's respondents, the tourism sector (57.9%), the mining sector (42.1%), the fisheries and aquaculture sector (42.1%) and the renewable energies sector (36.8%) could be drivers of change to preserve the biodiversity in Guyana. The sector that might be the more willing to integrate biodiversity commitments in its development have been assessed to be the tourism sector (17) and the renewable energies sector (13), followed by the timber and non-timber forest product extractions (9), fisheries and aquaculture (9) and banking sector (9). On the other hand, the sector that might be less willing to integrate biodiversity commitments in its development have been assessed to be the mining sector (14), the oil and gas sector (10), followed by the industrial agriculture (7). **Those answers corresponds to the assessment for the criteria 8.2.**

C.2 Results coming from the Report structure

The deforestation rate have been considered as a criteria (**criteria 1.1**). Those data has been published in the MRVS study in 2019. The first sector being the mining sector, followed by agriculture and forestry.

Driver	Area (ha)	EF (t CO ₂ /ha)	Emissions (t CO ₂ /ha)
Deforestation			
Mining	5,248	1,045	5,484,630
Mining Infrastructure	573	1,045	598,836
Forestry	226	1,045	236,190
Infrastructure	52	1,045	54,345
Agriculture	246	1,104	271,623
Settlements	22	1,045	22,992
Fire	6,371	804	5,123,752
Deforestation Total	12,738		11,792,369
Degradation			
Timber Harvest			1,766,523
Illegal Logging			10,463
Mining Degradation		22	58,131
Degradation Total			1,835,117
TOTAL CO₂ EMISSIONS FOR GUYANA FOR 2019 FROM FOREST SECTOR			13,627,486

Tableau 3. MRVS results, 2019. Source: MRVS Report Assessment 2019, GFC, 2020.

To balance out this terrestrial perspective, an additional criterion has been set to take into consideration the marine environment. The **criteria 1.2** attribute a score to the most impactful sectors on marine environment, which is the result of analysis proposed in the report structure: the oil and gas sector, the fisheries sector followed by the indirect effect of mining and agricultural sector.

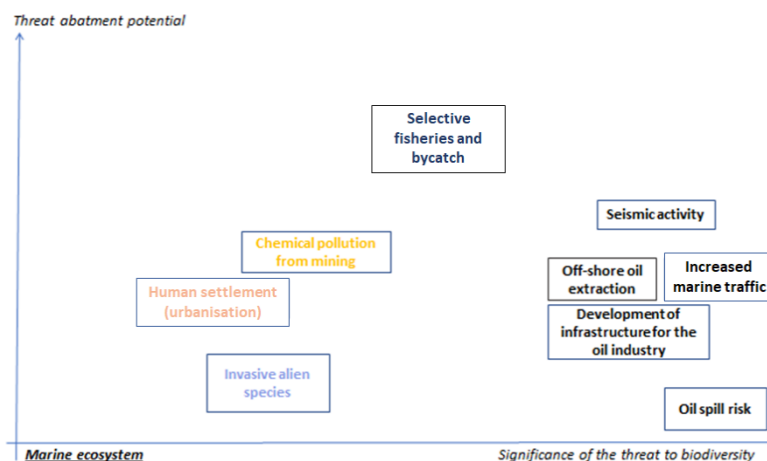


Figure 16. Threat on the marine ecosystems. Source : Report Structure, authors.

The **criteria 2.1** focus on the IBAT analysis that have also been highlighted in the Report Structure. This assessment estimates the contribution that an investment can make over a geographic area to reduce the risk of species extinction by reducing existing risks (mitigation potential). This measure lists **the threats to species at risk (VU, EN, CR), which has the best mitigation potential**, and are the following in Guyana:

- Fishing & harvesting aquatic resources, on a large extent, category (5.4.)
- Logging and wood harvesting (5.3.)
- Housing and urban areas (1.1)
- Agro-industry farming (2.1.3.)
- Mining and quarrying (3.2)
- Agro-industry grazing, ranching or farming (2.3.3.)
- Hunting & collecting terrestrial animals (5.1.1.)

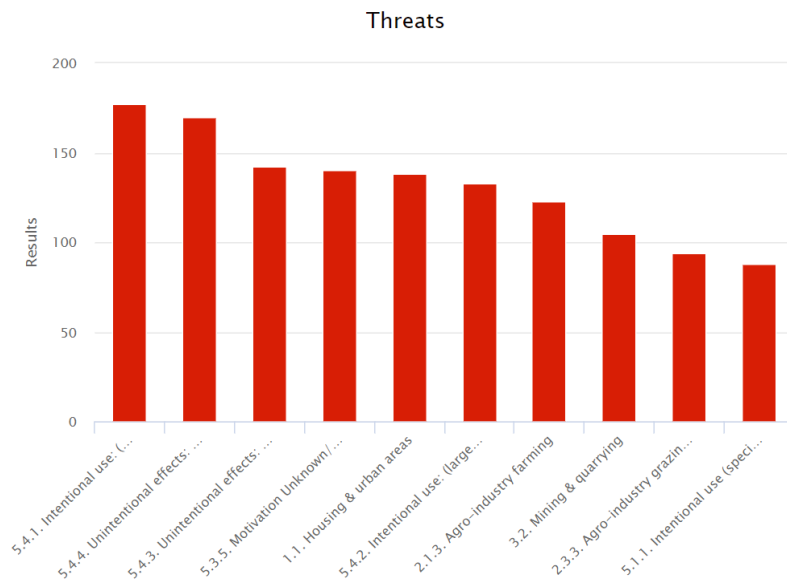


Figure 17. Threats to the species at risk having the highest mitigation potential. Source: IUCN, 2021

The attribution of scores is detailed in the excel reference document (annex 4)

The growth potential, [criteria 3.1](#), is also the result of previous analysis (Report structure), and highlights the exponential growth expected in the oil sector. This criterion also highlights the trend and desire to diversify agriculture, by introducing for example aquaculture, and to maintain or intensify the rice industry.

C.3 Results of the workshops

The entire summary of results is available in annex 1. The sectoral workshop helped to complete the criteria [5.2](#), [6.1](#), [6.2](#), [6.3](#), [7.3](#).

The relative [ministry support to co-lead stakeholder mobilization and commitment](#) correspond to the [criteria 5.2](#) and all ministries have been assessed as able and willing to facilitate those activities except for the oil and gas (as the activity is quite new, and the ministry of natural resources might not have sufficient experience, distance, and objectiveness to endorse such role on this specific extractive activity) and banking sector. This has been confirmed during an interview confirming that the current government is pragmatic and sees in the oil & gas sector an opportunity to enrich the country (interview X...), and though Guyana is quite active in terms of environmental responsibility, the government stay currently *“stuck into two responsibilities, one collective, national (alleviate the general poverty rate), the other international, global (ensure environmental responsibilities)”*.

The [criteria 6.1](#) is related to the experience of actors in making voluntary commitments and the forestry sector, the tourism sector and to a lesser extent, agricultural sector has been selected.

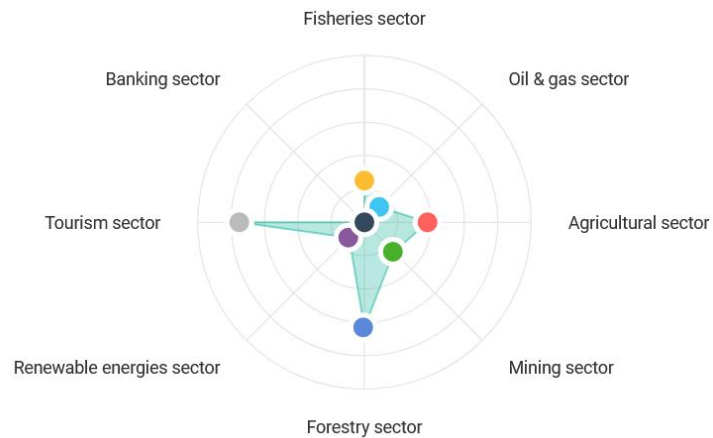


Figure 18. Answer to the question "which sector has most experience in making relevant and voluntary commitments". Source : Conservation workshop.

The **criteria 6.3** is the **capacity to be a driver of change**, or to trigger a change to better preserve biodiversity or to encourage other sectors to do so. This question has been asked during the conservation workshop, and the first ones has been the renewable energy sector, the forestry sector, the banking sector, followed by agricultural, mining and tourism sector. An additional point has been added for the top 4 sector selected through the questionnaire (tourism, fisheries, renewable energies-mining, banking).

Which sector has the capacity to trigger a positive change in another sector?

9 choix choix multiples

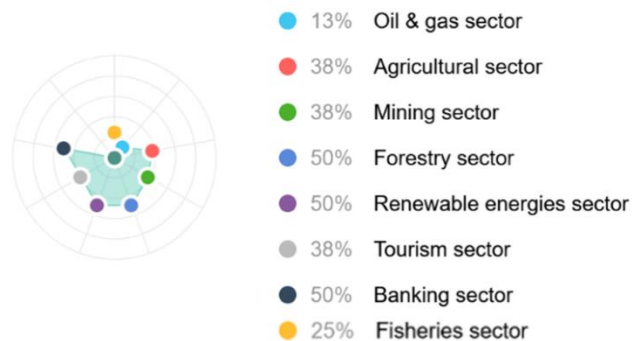


Figure 19. Answers from the conservation workshop to the question "which sector has the capacity to trigger a positive change in another sector".

In your opinion, which economic sectors could be a driver of change to preserve the biodiversity of Guyana?

26 réponses

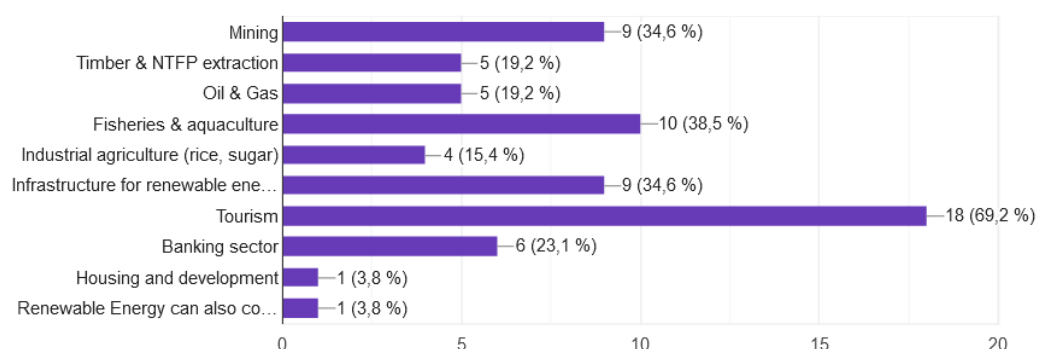


Figure 20. Answers to the questionnaire, to the question "in your opinion, which economic sectors could be a driver of change to preserve the biodiversity in Guyana".

However, during the sectoral meetings, the identified trigger of change for the renewable energy sector, tourism sector and fisheries were for the majority, the **evolution of the regulatory context, which depends on political decisions**. On the contrary, the triggers of change for the mining sector were the implementation of minimum impact techniques (mitigation hierarchy), the implementation of new business models, and the pressure from stakeholders and investors, which is more likely to merge from sectoral (economic) voluntary commitments. As regard the banking sector, changes were assessed to come mainly from the pressure from stakeholders and investors, which is independent from political decisions. Thus, an additional point has been attributed to the mining sector and banking sector for the feasibility of the change in the frame of BIODEV2030.

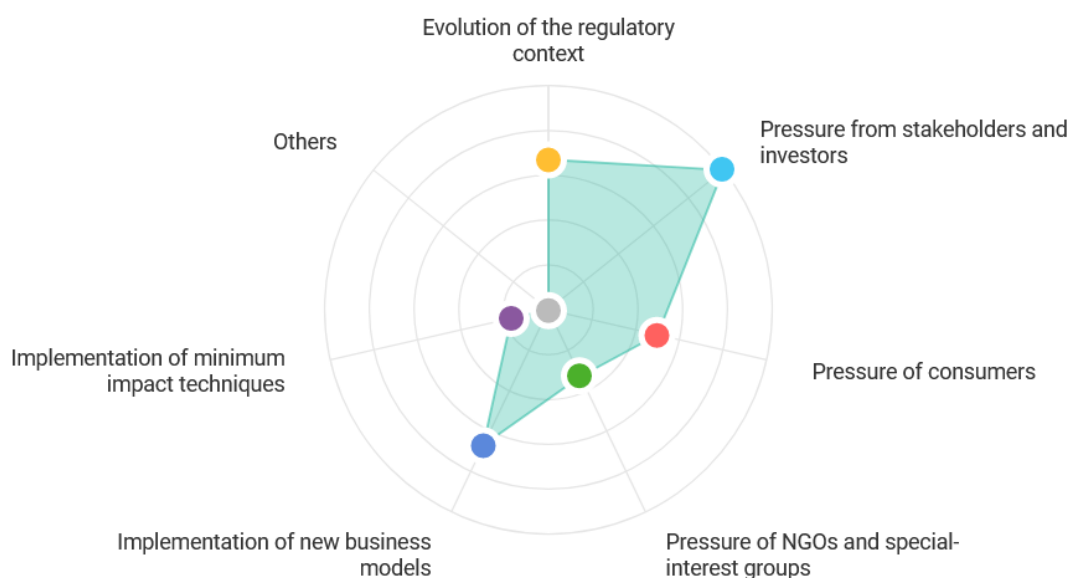


Figure 21. Answers obtained from the banking sector meeting to the question "what could trigger a change to better mainstream biodiversity in your sector"

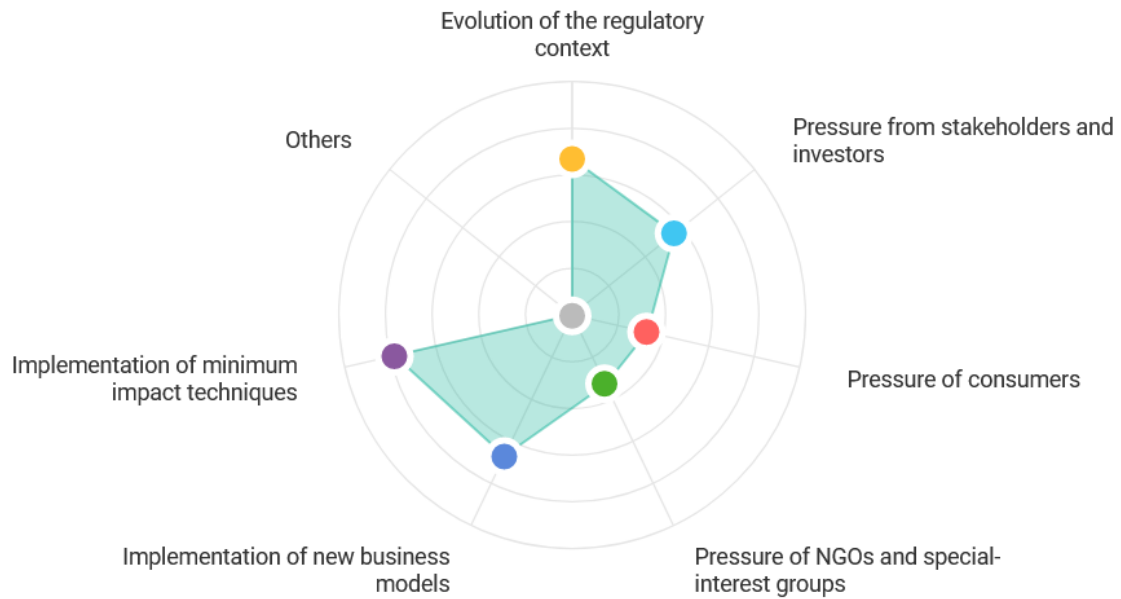


Figure 22. Answers obtained from the mining sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”

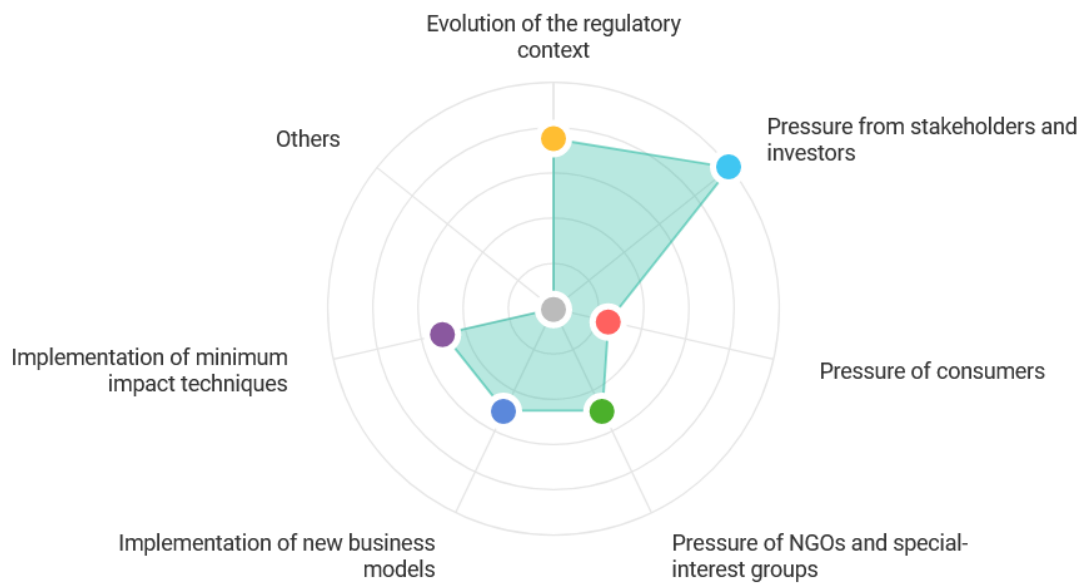


Figure 23. Answers obtained from the oil and gas sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”

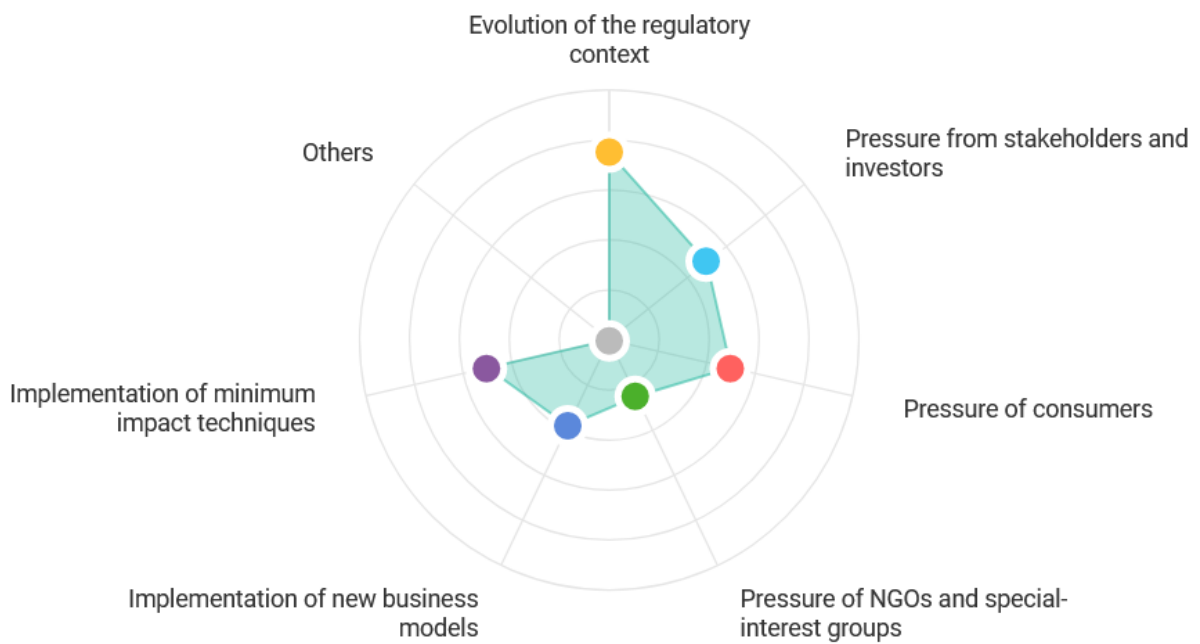


Figure 24. Answers obtained from the forestry sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”

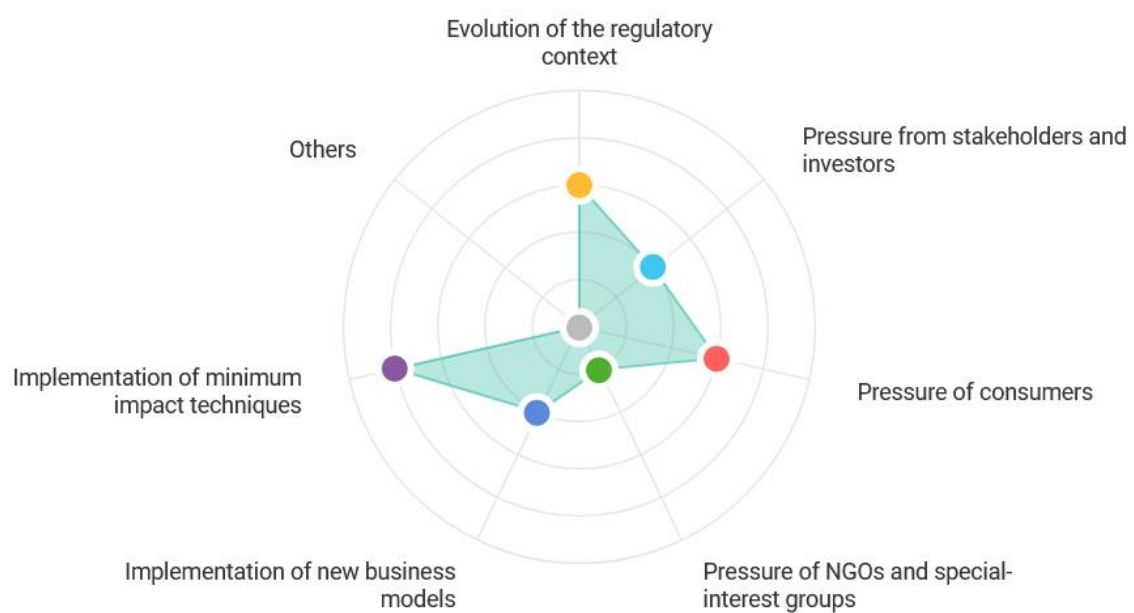


Figure 25. Answers obtained from the agriculture sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”



Figure 26. Answers obtained from the tourism sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”



Figure 27. Answers obtained from the fisheries sector meeting to the question “what could trigger a change to better mainstream biodiversity in your sector”

The **criteria 7.3** corresponds to the **expressed willingness**, which have been assessed by the number of potential commitments proposed during the sectoral meetings (reflect of the motivation of actors to find solution at the sectoral level), and a +1 has been added for the sectors assessed to be the most willing according to conservation actors: the mining and forestry sectors have been selected.

PROPOSED COMMITMENTS

Mining (8)	Agriculture (7)	Forestry (8)	Oil and Gas (3)
To have the most environmentally friendly practices implemented with the understanding that added income would be possible by marketing the products in that way.	Zone planning for agricultural districts so as to not upset the existing biodiversity or have minimal impact on it	Possibly increase the 5% of a concession left for biodiversity to 10%	Modest corporate social /environmental responsibility investments - Potentially CSR. Also the sector is seen active with Offsets
Establish biodiversity reserves	Reduce the use of agrochemicals	Potentially incorporate monitoring/ documenting biodiversity in the concessions so that if sensitive areas or species are present actions can be taken to preserve them with the help of authorities	Need to be pressured most likely and would need Government's backing.
Use of new technologies that improve recovery.	The Agri Sector can formulate and implement the necessary policy framework to mainstream Biodiversity in the day-to-day agri activity. Also the developing of the necessary legislation.	Low impact logging with price incentive or conservation concessions with financial incentives	There is a need for a sector wide strategic assessment of the environmental and social impacts.
Promotion of technology that allow greater recovery efficiency, so that mine closure can be realised. Greater emphasis on operations undertaking mine reclamation best practices.	Drainage and irrigation compliance with regulatory framework	Expanding biodiversity reserves in large concessions	
Collaboration among regulatory agencies to monitor the impacts of mining, and enforce where necessary, on land and waterways.	Using more bio-friendly pest control methods	Follow internationally recognized best practices in it's activities with the understanding that all players will be onboard	

Increased institutional and stakeholder commitment	It is crucial to focus on the conservation and use of Bioversity, also the sharing of the benefits derivrd from such resources.	GFC has stated that it is undertaking a process to develop certification standards for Guyana. Certification can help with mainstreaming biodiversity in sector operations.	
The environmental bond and fines need to be increased in the sector	Interest in seeing the initiatives that emanate from this first phase and other areas Interest in biodiversity and improvement in environment	Training and education	
		Collaboration with other natural resources agencies that also manage forests for a holistic approach to BD conservation	
Fisheries (3)	Renewable energies (4)	Tourism (6)	Banking sector (4)
If the proper regulatory and policy incentives are provided this will certainly assist in this regard	Prepare a bill and have it presented to the parliament.	Follow national/acceptable standard for how to operate in the tourism sector	More voluntary requirements
To ensure that all vessels have adequate exclusion devices, appropriate fishing gears, follow any stipulated fishing seasons, avoid marine protected areas and return to sea species that are threatened.	Agree in principle that infrastructure related to renewable energy be constructed with biodiversity in mind to ensure minimum negative impacts.	Train tour guides about biodiversity so that they can carry out their duties with biodiversity in mind	Make environmental impact assessments a part of the loan process.
Compliance monitoring needs to be improved in the fisheries sector	To always include an environmental impact assessment in projects to determine level of impact on the environment and possible mitigating measures.	Potentially award practices that directly maintain biodiversity since other awards are promoted in the sector	The banking sector should include clauses in the funding/loan agreement that incorporates biodiversity mainstreaming e.g restoration in the mining sector

	Utilize technologies and techniques to minimize negative biodiversity impacts.	Source food, transportation and other services from sources that are committed to sustainable practices that positively impact Biodiversity.	Provide funding to interested parties with feasible projects related to preserving biodiversity
		Education and outreach, stakeholders consultation and collaboration	
		Tourism sector is growing in Guyana, with so many of the existing positive impacts on biodiversity the sector should be supported and incentivized to continue on this path especially now that the market stands to expand further - Tourism does have its negative impact on biodiversity, but not nearly as comparable to mining, forestry, agriculture sectors, I feel its best that the sector that create widespread damage be shortlisted.	

Tableau 4. Proposed potential commitments for each sectors. Source: Sectoral meetings.

The experience of actors in making relevant and voluntary commitments correspond to the **criteria 6.1** and has been assessed during the sectoral workshops and the conservation workshop. The most experienced sectors have been assessed to be the forestry sector and the tourism sector, which can be attested by the REDD+ policy, the FLEGT process on one side, and the different awards Guyana received for its qualitative ecotourism economy (cf: Report Structure).

C.4 Results of the conservation workshop

The entire summary of results is available in annex 3. This final workshop, gathering conservation actors and researchers helped to complete the **criteria 3.2, 4.1, 5.1, 6.1, 6.2, 6.4, 7.1, 7.2, 8.1**.

The **irreversibility of the impact** has been assessed through the **criteria 3.2** based on the ability of sectors to mitigate impact with better practices. In fact, these criteria anticipate the second phase, based on the hypothesis that the reversibility of the impact is necessary to avoid sterile concertation during the formulation of voluntary commitments for the selected sectors (Phase 2). Thus, sectors which have impacts that can be mitigated with better practices have been attributed the highest scores. The forestry sector, the agriculture sector and the fisheries sector has been selected.

A specific workshop has then been dedicated to the **identification of sector's benefiting from available and usable data to define a baseline (criteria 4.1, 4.2, 4.3)** and the priority sector were forestry followed by mining and fisheries.

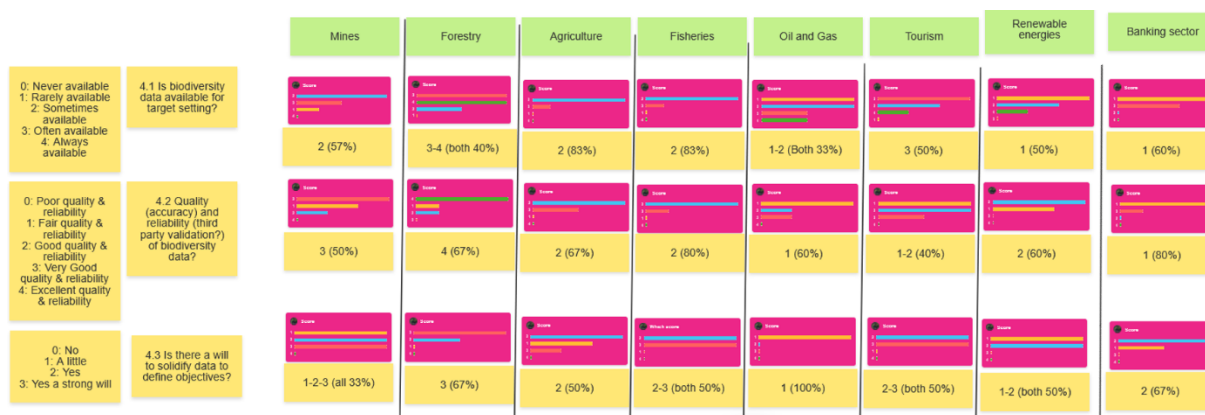


Figure 28. Workshop on the availability, quality, reliability and will to solidify data in order to define a baseline. Source : Conservation workshop.

As regard **actor's organization**, forestry and agriculture has been selected as the most organized one during the meeting, with the presence of union, researches, businesses etc. (criteria 5.1). In fact, for the agriculture sector, we can find the Guyana agriculture workers union (GAWU), several farms gathered under the Guyana Rice Development Board, and the NAREI is active on biodiversity issues in the sector. In the forestry sector, the Guyana Forestry Commission is quite active, and host the Forest training center that can be key in the development of commitments mainstreaming biodiversity in usual forestry's activities. Mining and Tourism comes second. For the mining sector, cooperatives and unions exists (National Mining syndicate, Guyana Gold and Diamond Miers Association, Guyana Women Miners Association), and from an external point of view, it could have been selected as an organized sector as well. For tourism, several structures exist, but independently, which is a limit to the creation of voluntary commitments. Also, as regards the oil and gas sector, a bilateral meeting confirmed that it seems impossible for the oil and gas sector to participate to the second phase as there is a strong "*structural size disequilibrium between companies*", one owning nearly all exploitable spills, and a general "*mistrust and caution in their approach*" (oil & gas actor's interview, 29/11/21).

An assessment of **what economic sector could gain** have also been made and corresponds to the **criteria 7.1 and 7.2**. which is the result of the conservation workshop (below).

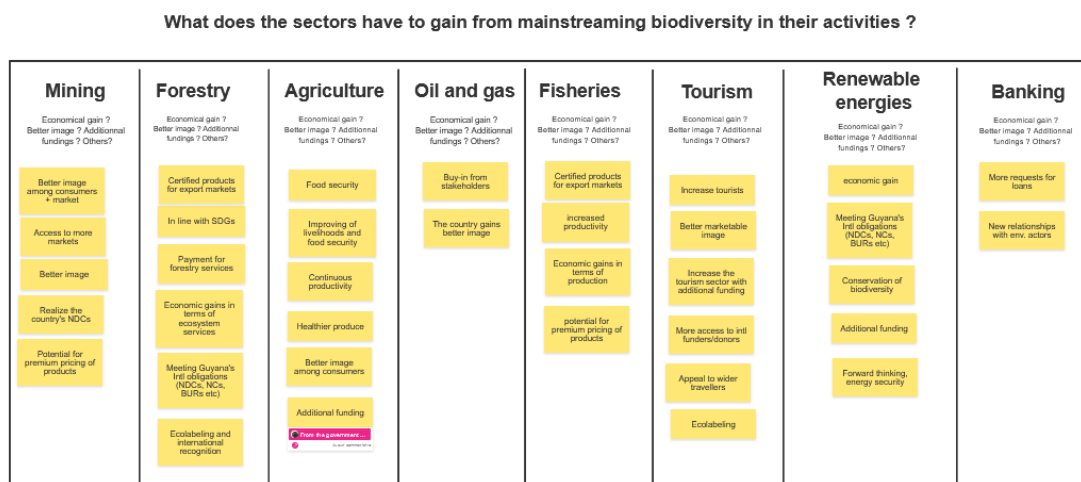


Figure 29. Answers from the conservation workshop to the question "what does the sector have to gain from mainstreaming biodiversity in their activity".

The **willingness of conservation actors** to work with sectors has also been assessed and correspond to the **criteria 8.1**. Conservation actors are prone to work with every sector, with a 100% attributed to agricultural sector

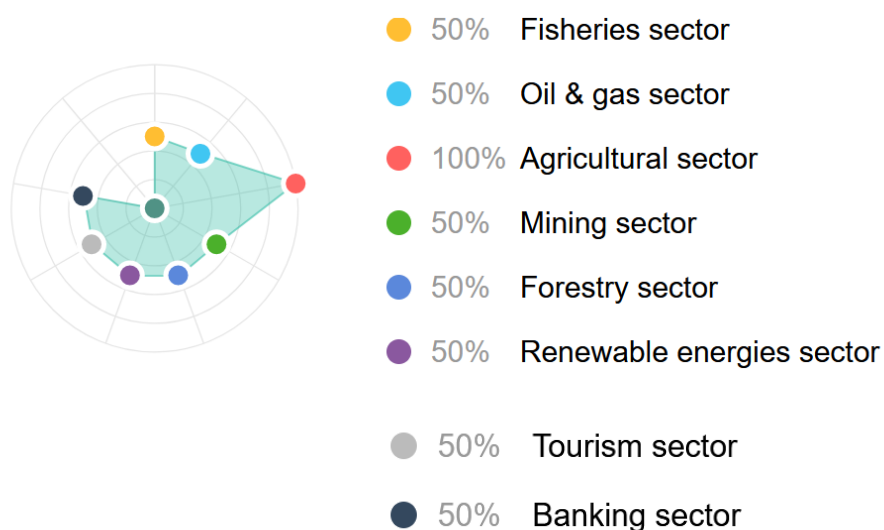


Figure 30. Answers from the conservation actors to the question “With which sector would you be most willing to work with on the creation of voluntary commitments, to mainstream biodiversity in their activities?”

C. 5 Selection of 2 priority sectors

The result of the first series of criterias (IMPACT) have been the following :

TOTAL IMPACT	MIN ES	FORESTRY	AGRICULTURE	FISHERIES	OIL&GAS	TOURISM	RENEWABLE ENERGIES	BANKING
	26	17	23	15	20	5	11	3

Tableau 5. Results of the scores for the section IMPACTS

The **mining sector, the agricultural sector and the oil and gas sector** are the most impactful on biodiversity in Guyana according to the series of criteria proposed.

The result of the second series of criterias has been the following :

TOTAL REVERSIBILITY	MIN ES	FORESTRY	AGRICULTURE	FISHERIES	OIL&GAS	TOURISM	RENEWABLE ENERGIES	BANKING
	17	20	14	12	7	14	11	8

Tableau 6. Results of the scores for the section REVERSIBILITY

The **forestry sector, the mining sector and the the tourism sector** are the sector with the best potential to mitigate or reverse their impact on biodiversity in Guyana according to the series of criteria proposed.

The result of the third step has been the following :

TOTAL WILLINGNESS	MINES	FORESTRY	AGRICULTURE	FISHERIES	OIL&GAS	TOURISM	RENEWABLE ENERGIES	BANKING
	9	11	10	7	3	10	8	7

Tableau 7. Results of the scores for the section WILLINGNESS

The **forestry sector and the tourism sector** have been assessed as being the more encline to mainstream biodiversity into their activity in Guyana according to the series of criteria proposed.

The final result (all criteria combined) of the scoring prioritization system have been the following :

	MINES	FORESTRY	AGRICULTURE	FISHERIES	OIL&GAS	TOURISM	RENEWABLE ENERGIES	BANKING
TOTAL WILLINGNESS	55	48	47	34	30	29	30	18

Tableau 8. Final results of the scoring process

The mining sector, the forestry sector and the agricultural sector have been prioritized.

D. Discussion

D. 1 General view on economic development

In Guyana, ecosystems are **unevenly affected** by economic development. The population is concentrated **on the coast**, where 90% of the population is located. As a result, **agriculture** (rice-sugar cane) is developed on the coast and **fishing** (artisanal) activity generate the most employment in the country. Recently, **offshore oil wells** have been discovered in the sea, close to the coast, which has added a source of pressure on this geographical area. This activity presages an oil boom and promises a considerable **development opportunity**, given the windfall of money that oil extraction will generate. Nevertheless, the government anticipates both the limitation of the oil resource and the potential future change in international paradigms in favor of greater taxation of fossil fuels, and therefore aims to **diversify agriculture** in parallel, especially in the interior of the country. Guyana's ambition to both

become the breadbasket of the Caribbean¹ and reduce its food import bill is real, and indeed, intensive and mechanized soybean and maize farming are established projections.

Further inland, the forests (more or less mountainous) and savannahs are disturbed by other extractive activities, **mining and logging**, that holds impacts on biodiversity even though the deforestation rate is one of the lowest in the world, with 0.07% annual deforestation. Indeed, the **lack of logistics** has long "saved" the country from forest degradation, with logs and minerals mainly transported by river. However, infrastructure projects, such as the proposed road between Lethem and Linden, could have a considerable impact on biodiversity by **facilitating access to the south of the country**. Opening the forests via this road might provide privileged access to loggers and miners (both formal and illegal) and facilitate the development of tourism. It will also allow Brazil to access these areas, and the sea, by opening up Boa Vista. The savannahs might thus be more accessible, and the development of mega farms (that already started) is a likely scenario. Finally, the recent approval of the **Amaila Falls Hydropower Project** risks generating significant impacts on hydraulic ecological continuities and opens the door to other projects of this type.

To underpin these economic activities, the banking sectors (along with the insurance sectors, often linked) are crucial. For the past 30 years, Guyana **has not had a development bank**, only commercial banks. So-called **"green" loans** aim to finance renewable energy projects, but do not have low interest rates, making the name more cosmetic than meaningful. Guyana remains very **dependent on the investment of international banks or foreign companies** for its development, which have a determining role on the degradation of biodiversity, through the projects they choose to finance.

D.2 Explanations for the chosen priority sectors.

Given **their anteriority and the scale** of their activities, it is not surprising that **the mining sector and the agricultural sector** were given priority. Moreover, no projections announce the decrease of these activities, on the contrary, the mines are brought to prosper with both the **opening of new roads to the south of the country, and the modernization of the port infrastructures** which will be the corollary of the development of the oil activity; and agriculture is set to **diversify, both in favor of more vegetable production, with the construction of mega-farms, and intensive and mechanized farming of soybeans and corn (Brazilian model)**, especially to achieve independence for livestock feed. Finally, in terms of organization, the actors are relatively **identified and accessible**, and the ministries are well structured. Initiatives in favor of a better consideration of biodiversity issues have been identified and past initiatives can also be recycled and modernized. In agriculture, for example, there is a willingness to form a national plan for organic agriculture, to integrate aquaculture with rice crops, to recover the practices of creole gardens, and to regulate and control inputs. Regarding mining, opportunities for off-setting, improving practices through new techniques and technologies to ensure greater recovery efficiency of abandoned sites and the creation of collaborative platforms on best practices to adopt is an idea to develop, either at the national level or regional level (Guiana Shield).

The country's other historical sectors are **fishing and forestry**. However, since fishing is mostly artisanal, with the exception of a few industrial actors (we counted three official ones), it is unlikely that the actors could be brought together around the same consultation table to reach a common agreement on a potential voluntary commitment by the sector. There is the Guyana National Fisherfolk Organization (GNFO) which represents the artisanal fisheries sector and practices are very diversified throughout the sector. As for **aquaculture**, it is often associated with agricultural activities, and could be developed within the agricultural sector. Moreover, although there are few studies on the evolution of stocks, the resource is relatively unthreatened by fishing activities. In this sector, the damage to biodiversity is mainly indirect, identifiable upstream, via the pollution of waterways (particularly with the bioaccumulation of heavy metals). With regard to **forestry**, it is a present activity, which seems to decline but might have a **growth potential**. Indeed, the opening of new roads and the end of the ban on log exports suggests that a revival of forestry activity is to be expected. This can also be explained by the agreement linking the state to the Norwegian REDD+ fund, for which the allocation of funds for conservation is conditional on a minimum of

¹ <https://www.ifad.org/fr/web/operations/w/pays/guyana>

forest exploitation. This is a reward mechanism for good forest management, which is based on an avoidance scenario of projected deforestation. However, good practices are becoming more widespread, and in the forestry sector, logistics are more damaging than logging *per se*, and thus fall into the economic sector of **infrastructure construction** and the political area of **land use planning**.

Concerning the impact of the oil sector, it will obviously be a **determining factor in the evolution of the country in the future**, and a driver of the erosion of marine and coastal biodiversity. Nevertheless, the historical impact is nil, and the sector isn't yet sufficiently organized and experienced to make sectoral commitments. Moreover, private actors operate in a climate of **fierce competition**, which is not conducive to the establishment of sectoral consultations. In addition, political support will be low, as the degree of independence of the state in the development of the oil industry is low. The **World Bank** is financing the development of the legal and institutional framework aimed at maximizing the economic and social benefits of the sector's development, and the contracts signed between the oil companies and the state do not seem to position the state as an influential player in this power relationship.

With regard to **renewable energies and tourism**, their impact is minor compared to the impacts generated by extractive industries. However, particular attention should be paid to the construction of hydroelectric dams and other renewable energies, which contain their share of environmental damage under the guise of the green image they project (see: Report Structure). As for **tourism**, it is widely advised to encourage the government to make the calculation of **load capacities** on tourist sites mandatory, to promote ecotourism and to generalize environmental education through this means.

Finally, the **banking sector is indirectly the sector with the greatest impact** on biodiversity and the one most likely to be an **agent of change**, as it allocates the funds necessary for economic activity. Indeed, several initiatives could be settled to mitigate the impact of economic activity on biodiversity. For example, **loan allocation processes** could be conditioned to environmental impact assessments, or to the integration of clauses dedicated to the protection of biodiversity, loans with **preferential interest rates** could be granted to sustainable development projects, etc. To do this, Guyana could, for example, rehabilitate a **national "green development" bank**, to capture international funds specifically allocated to biodiversity protection. However, this sector did not emerge as a priority sector for several reasons. First its impact on biodiversity is not quantified and difficult to quantify. Banking networks are international and structured in complex associations, which generally conceal the exact origin of funds, making it hard to seize. Second, Guyana remains very dependent on the international banking sector, and engaging those actors for the second phase seems complex. Nevertheless, it is advisable to organize a **multi-donor meeting** in order to take these issues into account and optimize the financing of biodiversity. As a cross-cutting sector, the banking sector (national and international) should be included in the sectoral consultations planned for Phase 2.

D.3 Recommendation for the second phase.

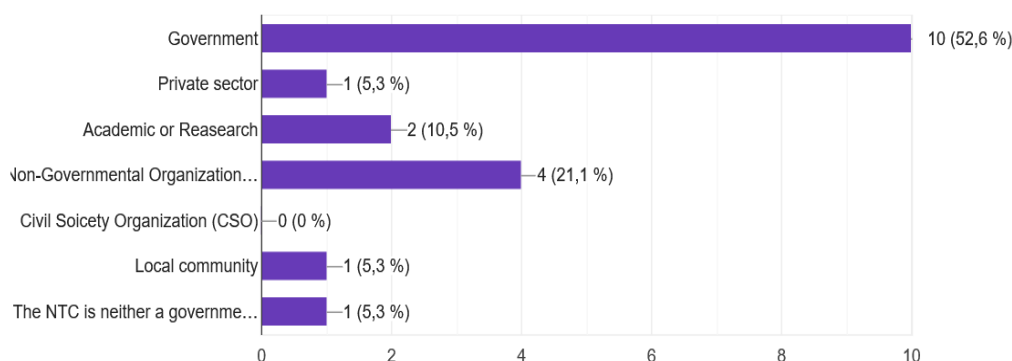
WWF and the working group will now have to decide on the sector to select, either 2 or 3 sectors. In the second phase, Biotope suggests that the selected sectors work together on **development scenarios**, using prospective methods, by including ministries and if possible, the vice-president. In fact, **political support will be key** and initiatives are underway, which is a positive signal. In the mining sector, a National Initiative for Responsible Mining has been developed by the government, and voluntary commitments could concretize the implementation of this initiative. The Ministry of Natural Resources will also bring a systemic view of mining issues, as it also oversees forestry issues, which may compete with mining activities. Opportunities for multi-sectoral engagement may thus emerge. As regard the agricultural sector, the government has developed a Climate Smart Agriculture initiative, and even small-scale organic businesses are keen to participate in the second phase activities, with the intention of collectively thinking about a national transition to an organic agriculture. The Ministry of Agriculture seems also very present with farmers and could be a support for the development of feasible commitments, aligned with the political dynamics at work.

In addition to these results, Biotope wished to draw attention to the **marine and freshwater ecosystems**, which are poorly documented and whose real impact of development activities is therefore little known, little quantified and probably underestimated. We advise the NGOs and university to boost the research on those ecosystems, for the sake of biodiversity conservation.

Annex 1: Questionnaire results

Type of organization affiliated to?

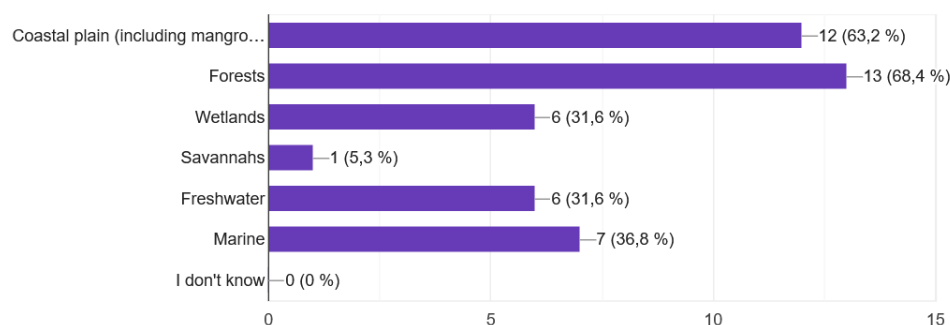
19 réponses



52.6% of the respondent have been government actors, 21.1% have been NGOs, 10.5% have been academic or researchers.

Which ecosystem in Guyana most requires conservation?

19 réponses



The ecosystem that most requires conservation are the coastal plain (63.2%), the forests (68.4%) and wetlands(31.6%)

Why :

- **Forests** : This ecosystems are highly threatened by anthropogenic activities which make them more vulnerable.
- **Coastal plain (including mangrove forests), Forests, Wetlands, Savannahs, Freshwater, Marine** : They provide environmental and economic benefit to the country and the world.
- **Coastal plain (including mangrove forests), Wetlands, Freshwater** : Threats to Guyana's Freshwater systems are increasing with increasing population growth infrastructure and Oil and Gas development.
- **Forests, Wetlands, Marine** : There are a number of threats faced from anthropogenic factors and also climate change (multiple impacts). There is also no protective mechanisms.
- **Coastal plain (including mangrove forests), Forests, Wetlands, Freshwater, Marine** : Natural Resources utilized for human development
- **Coastal plain (including mangrove forests), Marine** : Most threatened
- **Coastal plain (including mangrove forests), Forests, Marine** : Oil and gas will put pressure on marine ecosystems and on forests for development purposes
- **Forests** : Because this system is mostly affected by mining

- **Forests, Marine** : Due to the present oil find marine life would be greatly impacted. its not too late to start conservation before the impacts can be measured. the forest must be conservred to reduce climate change
- **Forests** : This is the system that is mostly affected by mining
- **Forests** : This is because mining activities occur in forested areas and the forest are destroyed at an alarming rate to facilitate mining.
- **Coastal plain (including mangrove forests)** : 90% of the population are on the Coastal Plain. Presently, petroleum related businesses are taking over the beachfronts along the coast. Without some form of conservation, the Plain could become an ecological disaster waiting to happen.
- **Coastal plain (including mangrove forests), Wetlands** : Because major develop is taking place in both wetland and coastal areas with little regard to those ecosystems. We are in a climate crisis, where coastland and wetlands are carbon sinks, efficient remedies to the rising temperature. Additionally, these areas are the home to many unique and important biodiversity that are yet to be full studied and understood.
- **Coastal plain (including mangrove forests), Forests, Wetlands, Freshwater**:To contribute to the efforts of combating climate change and to ensure preservation and/or reduce impact on fresh water for domestic use.
- **Coastal plain (including mangrove forests), Forests**: They both are being threatened and also being lost due to development activities (coastal plain) and heavy extraction by the extractive industry (forest).
- **Coastal plain (including mangrove forests)**: Most of the country's economic activity happens along the coast. As such there is greater risk of the ecosystem being negatively impacted
- **Coastal plain (including mangrove forests), Forests, Freshwater, Marine**: These ecosystems are very important to the resilience and sustainability of Guyana, as well as the livelihoods of the people
- **Freshwaters**: Increased pollution from mining and expansion of mining into critical watersheds and areas of important biodiversity. Sources of critical river systems should be protected particularly those with cultural significance and ecological values. Specific regions in Guyana, based on climate projections, will experience significant water deficit in the future which will have an impact on availability of freshwater.
- **Coastal plain (including mangrove forests), Forests, Freshwater, Marine**: There is not sufficient protection for mangroves and marine ecosystems which are currently threatened due to the economic development linked to oil and gas sector in Guyana.
- **Forests, Marine**: Development within Guyana will definitely impact our environment, be it the marine life with the coming if oil and or the forest, due to mining, forestry etc. Sustainable development should be out key word for generations to benefit ecologically, economically, culturally and socially.
- **Forests** : Forest harvesting (lumber) forms one of Guyana's export product market. Trees are a main source of eliminating greenhouse gas and therefore, they should be mechanisms in place to ensure that trees harvested are replaced. In addition, trees are been removed to make space for mining.
- **Coastal plain (including mangrove forests), Freshwater**: Because locals and aquatic animals rely on the ecosystem for their daily livelihood and to survive.
- **Coastal plain (including mangrove forests)**: Natural Sea Defense, Marine ecosystem-provides nursery for many species of fish
- **Coastal plain (including mangrove forests), Forests, Freshwater**: To contribute to global ambitions e.g. re climate change. Communities depend directly on these resources in Guyana

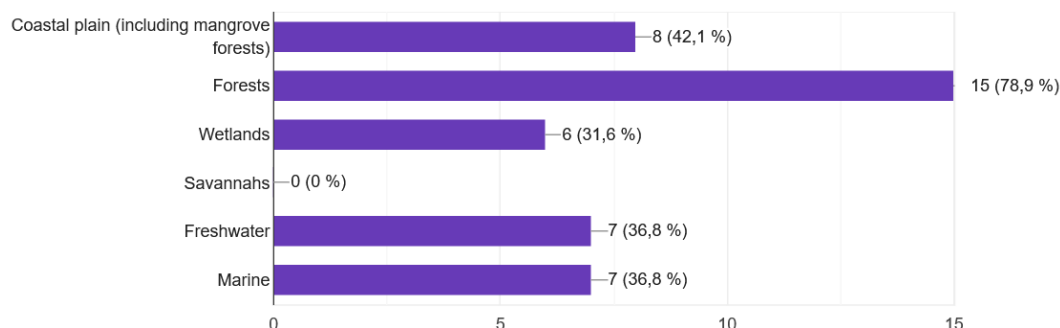
In your opinion, how do think the ecosystem can be better managed?

- Sustainable ecosystem management is key to Guyana's development. There needs to be better environmental compliance and enforcement of existing legislation that safeguards the environment.
- Mangroves and wetlands
- Better and stronger national level policies that are executed and enforced at a community level.
- There is need for management planning framework and the need for resource management

- By having more programs, projects, resources to prevent or if not mitigate impacts, restore, maintain and enhance ecosystems. empowering the biggest users/consumers with tools and resources (financial) to undertake restoration, rehabilitation, protection, reforestation, afforestation etc.
- More coordination between agencies responsible and have a mandate on that particular ecosystems
- By having protected areas and putting policies and laws in place for harvesting of resources
- Recognise that Indigenous Peoples (IP) are the best stakeholders in managing and conserving ecosystems; Utilize the knowledge of the IP; Implement sustainable practices; Allow the IP to participate in local and national ecosystems monitoring.
- Petroleum companies and conservationists working together to slow down the rate of destruction recognising that the Coastal Plain is fragile.
- First of with an overarching legislation passed by the Government to manage and conserve these areas. An organization also needs to be actively assigned, with enough finances and trained staff to regular monitor, assist with urban planning and coastal protection strategies and conduct regular research.
- More robust, credible and effective enforcement of existing laws.
- Enforcement of environmental regulations
- Better planning for these ecosystems, developing and implementing policies, setting targets for achieving goals, monitoring and evaluation of targets
- Requires efforts by all stakeholders not only government. Incentives especially for the private sector and communities are necessary and stronger enforcement of current legislation. An overarching environmental and land (not land use but land) policy are necessary.
- Better policies in place and enforcement of the policies. Training new staff, scientists etc. on effective management, research and data collection, and etc. will also help.
- Therefore management, monitoring, enforcement and all other factors to make this happen must be apply
- The ecosystem can be better managed by having protected areas, increased capacity building to encompass safe ways to harvest trees, without damaging the environment and how to restore the areas once mining has been abandoned.
- Routine monitoring on the causes of ecosystem damages and research where necessary.
- With the implementation of rigid monitoring practices
- Regulation of competing users. Best practices to safeguard and restore the ecosystem by users.

Which ecosystem is the most threatened by human activity and development in Guyana?

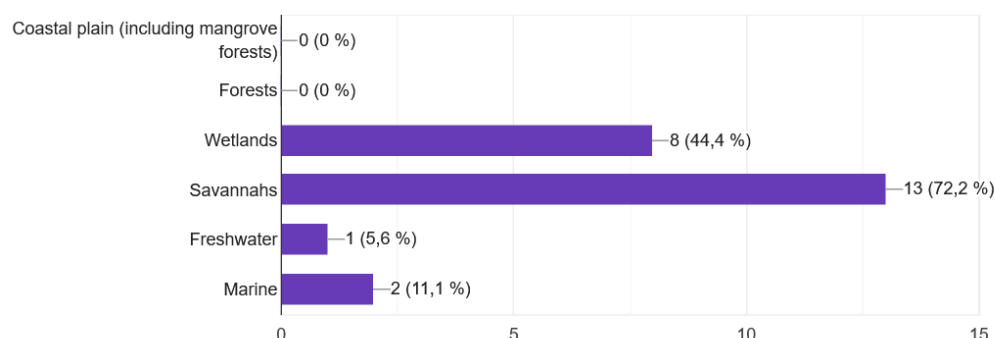
19 réponses



The ecosystems that are more threatened by human activity are forests (78.9%), Coastal plain (42.1%), Freshwaters (36.8%) and marine ecosystem (36.8%)

Which ecosystem is the least threatened by human activity and development in Guyana ?

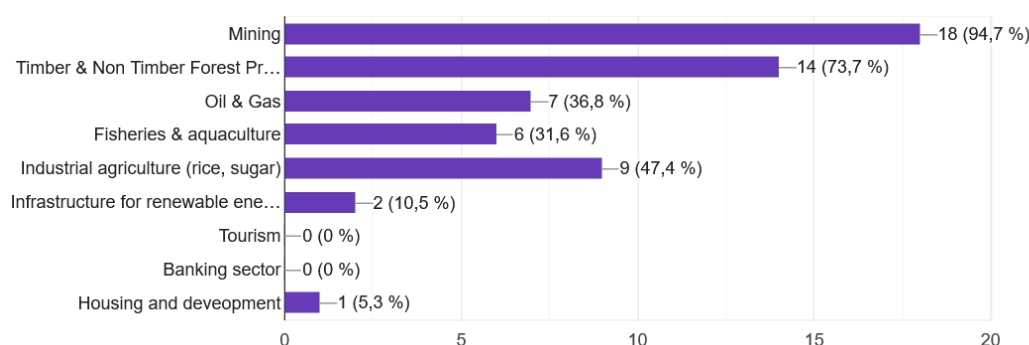
18 réponses



The ecosystems that are least threatened by human activity are savannahs (72.2%) and wetlands (44.4%).

What three sectors are mostly responsible for biodiversity loss in Guyana?

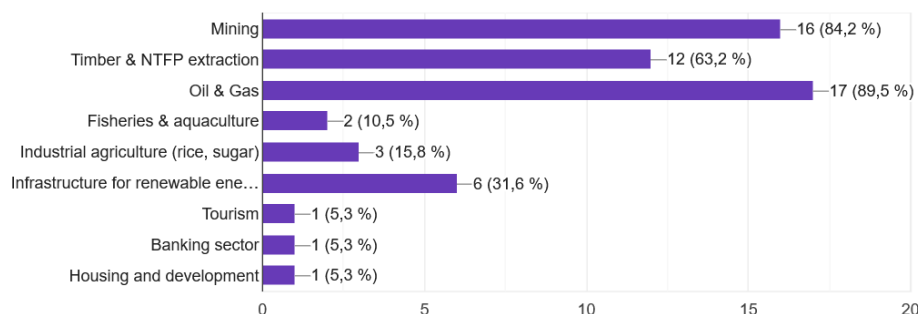
19 réponses



The three sectors that are mostly responsible for biodiversity loss in Guyana are mining (94.7%), Timber and non-timber extraction (73.7%) and industrial agriculture (47.4%), followed by oil and gas sector (36.8%), fisheries and aquaculture (31.6%).

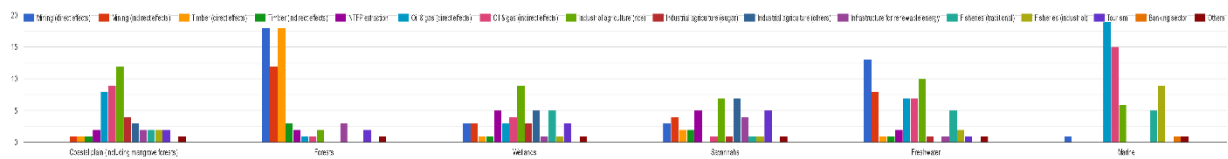
In the future, what will probably be the three most impactful sectors responsible for biodiversity loss in Guyana?

19 réponses



In the future the most impactful sectors on biodiversity might be the oil and gas sector (89.5%), the mining sector (84.2%) and the timber and non timber extraction (63.2%)

In your opinion, what are the main factor(s) of degradation of Guyana's ecosystems. Please choose a maximum of 3 activities per ecosystem.



On the coastal plain, the 3 main factors of degradation are :

- Industrial agriculture (rice)
- Oil and gas (indirect and direct effects)

On forests, the 3 main factors of degradation are :

- Forestry (direct and indirect effect)
- Mining (indirect effects)

On wetlands, the 3 main factors of degradation are :

- Industrial agriculture (rice and others)
- Fisheries (artisanal)
- NTFP extraction

On savannahs, the 3 main factors of degradation are :

- Industrial agriculture (rice and others)
- Tourism
- NTFP extraction

On freshwaters, the 3 main factors of degradation are :

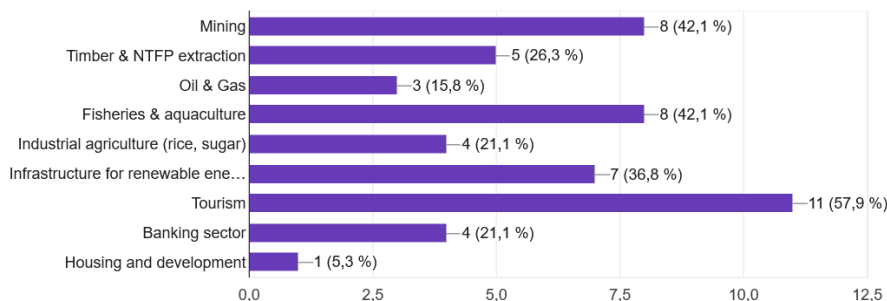
- Mining (direct and indirect effects)
- Industrial agriculture (rice)
- Oil and gas (direct and indirect effects)

On marine ecosystem, the 3 main factors of degradation are :

- Oil and gas (direct and indirect effects)
- Fisheries (industrial)

In your opinion, which economic sectors could be a driver of change to preserve the biodiversity of Guyana?

19 réponses

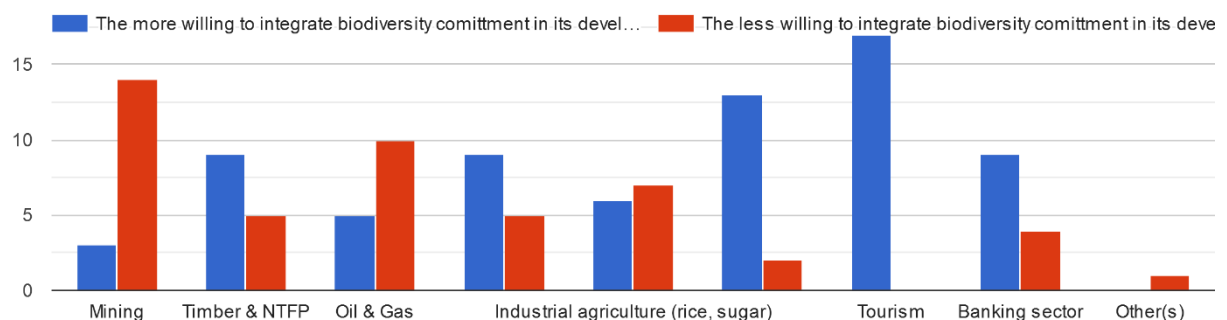


The economic sectors that could be drivers of change to preserve the biodiversity of Guyana might be the tourism sector (57.9%), the mining sector (42.1%), the fisheries and aquaculture sector (42.1%), the renewable energies sector (36.8%).

Why :

- They extractive industry sector has always led Guyana as it relates to degradation. If we can change the mining culture it can set a precedence for other sectors.
- They would be responsible for reduction in the biodiversity whether direct or indirect.
- Conduct mining in the right manner ie exploration, extraction and reclamation. stop the hit or miss system. proper monitoring of the fisheries and aquaculture sector. provision of more aquaculture farms to be less dependent on salt water species
- Because they all can be regulated or can use a small footprint which aids in the preservation of biodiversity here in Guyana
- All of these industries are not full regulated in terms of biodiversity impacts.
- There are more stringent international agreements for the protection of forest and to combat global warming. Guyana has signed on to some of these agreements.
- These sectors are directly involved with biodiversity loss and with proper management can contribute to biodiversity conservation
- The banking sector could drive the inclusion of environmental, social and governance criteria in its loans, insurance and banking policies to protect against environmental degradation. The eco-tourism sector in Guyana requires functional and vibrant ecosystems and biodiversity as base products - the very survival of the sector depends on securing and maintaining Guyana's biodiversity.
- Tourism can always be accomplished with environmentally sustainable agendas. Renewable energy is both sustainable and can promote circularity. Both, if done in these ways, will engender biodiversity conservation.
- Guyana is know as an eco-tourism destination, therefore any tourism development must work to enhance biodiversity and not degrade. The development to erect lodges and the type of activities conducted within the environment must be complementing the area. I think the same can be said about the fisheries and aquaculture sector. For us to really balance development and maintain our biodiversity will need to be a collect effort and I guest that where the green development or the sustainable development plan for Guyana will need to apply
- Sufficient funds will funnel into to biodiversity to help preserve the species

In your opinion, which sector is



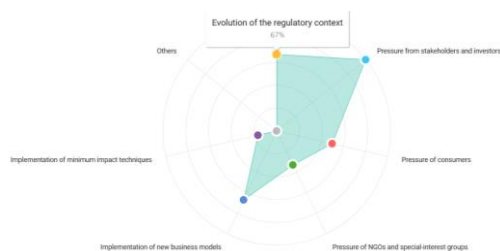
The sector that might be the more willing to integrate biodiversity commitments in its development are the tourism sector and the renewable energies sector, followed by the timber and non timber forest product extractions, fisheries and aquaculture and banking sector.

On the opposite, the sector that might be less willing to integrate biodiversity commitments in its development are the mining sector, the oil and gas sector, followed by the industrial agriculture.

Annex 2: Results from the sectoral workshops

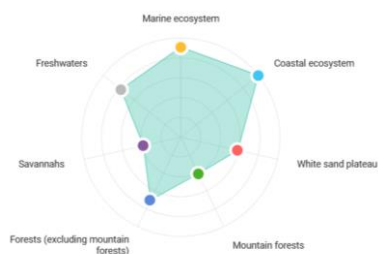
Banking sector

Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

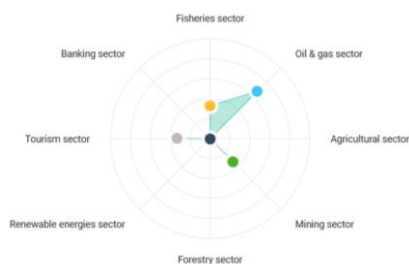


Classify the ecosystems, starting with those most affected by the activities of your sector

- 1 Coastal ecosystem
- 2 Marine ecosystem
- 3 Freshwaters
- 4 Forests (excluding mountain forests)
- 5 White sand plateau
- 6 Mountain forests
- 7 Savannahs



On the selected ecosystems, which other sector could be seen as a competitor?



BOARD

Which activity impacts the **marine ecosystem**?



What are the **Impacts**?



Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?



Which activity impacts the **coastal ecosystem**?



What are the **Impacts**?



Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?



Which activity impacts the **freshwaters ecosystem**?



What are the **Impacts**?



Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?



Which activity impacts the **forest ecosystem**?



What are the **Impacts**?



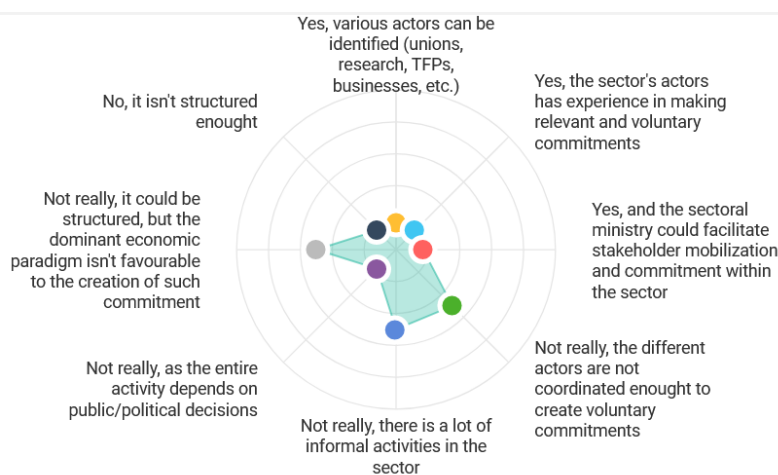
Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?



What could trigger a change to better mainstream biodiversity in your sector ?



Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Provide funding to interested parties with feasible projects related to preserving biodiversity
- More voluntary requirements
- Make environmental impact assessments a part of the loan process.
- The banking sector should include clauses in the funding/loan agreement that incorporates biodiversity mainstreaming e.g restoration in the mining sector

Willingness to participate to phase 2 : not relevant, not enough participant.

Comments :

- The banking sector should include clauses in the funding/loan agreement that incorporates biodiversity mainstreaming e.g restoration in the mining sector

Oil and gas sector

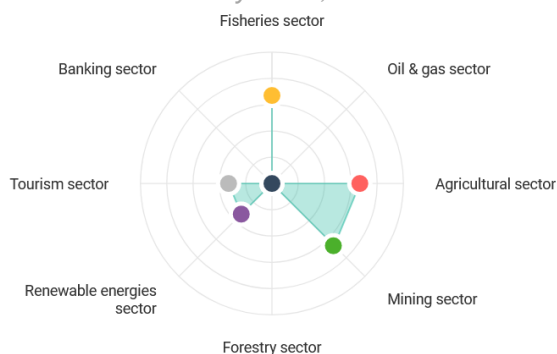
Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

Mining Oil
Marine Gas,
Gold

Classify the ecosystems, starting with those most affected by the activities of your sector

- 1 Coastal ecosystem
- 2 Marine ecosystem-Freshwaters
- 3 White sand plateau-Forests (excluding mountain forests)
- 4 Mountain forests
- 5 Savannahs

On the selected ecosystems, which other sector could be seen as a competitor?



BOARD



What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

- Legal proceedings
- Public pressure
- Regulatory changes
- Special interest group

Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Modest corporate social / environmental responsibility investments
- Potentially CSR. Also the sector is seen active with Offsets
- Need to be pressured most likely and would need Government's backing.

Willingness to participate to phase 2 : not relevant, not enough participant.

Comments :

- There is a need for a sector wide strategic assessment of the environmental and social impacts.

Forestry sector

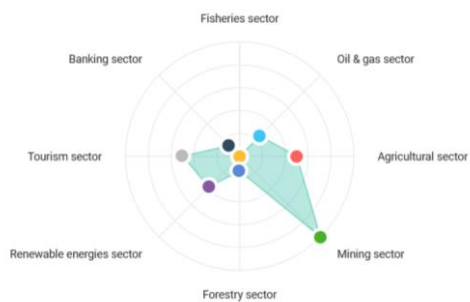
Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

negatively
Energy
impactful
Mining
Gas and community
mining, including
Forestry

Classify the ecosystems, starting with those most affected by the activities of your sector

- 1 Forests (excluding mountain forests)
- 2 Freshwaters
- 3 Mountain forests
- 4 White sand plateau
- 5 Savannahs
- 6 Coastal ecosystem
- 7 Marine ecosystem

On the selected ecosystems, which other sector could be seen as a competitor?



BOARD

Which activity impacts the **freshwaters ecosystem**?

Logging both legally & illegally in watersheds

What are the **impacts**?

Freshwater pollution due to sedimentation from erosion, etc

Pollution from discharge such as waste oil and other fluids

Does any incentives exist to **mitigate (or boost if positive) this impact** at your sector's scale?

Which activity impacts the **forest ecosystem**?

Illegal logging
Land clearing for mining
New road development
Agriculture and settlements are identified as impacting forests in MIVS year 9 report.
Overharvesting of wildlife
Lack of education of consumer on certification interest
Fires
Traditional Logging that doesn't follow the best practice to reduce impacts in felling trees.
Illegal activity problem is procedural (papers etc.) not criminal

What are the **impacts**?

Sustainable logging is not followed
Deforestation
Land degradation
Fragmentation
Sustainable forest certification increasing income
Increased access to wildlife habitat
Fragmentation and degradation

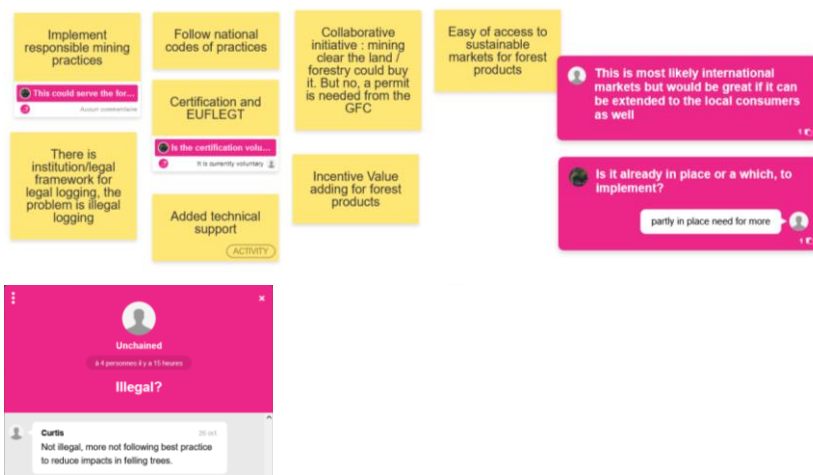
Does any incentives exist to **mitigate (or boost if positive) this impact** at your sector's scale?

Implement responsible mining practices
Follow national codes of practices
Collaborative initiative: mining clear the land / forestry could buy it. But no, a permit is needed from the GFC
Easy of access to sustainable markets for forest products
Certification and EUPLEOT
Incentive Value adding for forest products
Added technical support
There is institution/legal framework for legal logging, the problem is illegal logging
This is a social legacy order



Focus on comments

Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?



What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

Investment

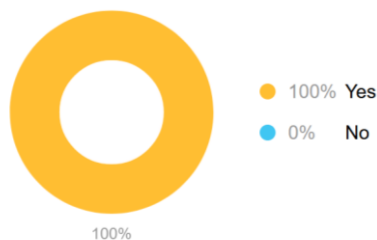
Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Possibly increase the 5% of a concession left for biodiversity to 10%
- Potentially incorporate monitoring/ documenting biodiversity in the concessions so that if sensitive areas or species are present actions can be taken to preserve them with the help of authorities
- Low impact logging with price incentive or conservation concessions with financial incentives
- Expanding biodiversity reserves in large concessions
- Follow internationally recognized best practices in it's activities with the understanding that all players will be onboard
- GFC has stated that it is undertaking a process to develop certification standards for Guyana. Certification can help with mainstreaming biodiversity in sector operations.
- Training and education
- Collaboration with other natural resources agencies that also manage forests for a holistic approach to BD conservation

Willingness to participate to phase 2 :



Comments :

- Commitments change also drive change

Agricultural sector

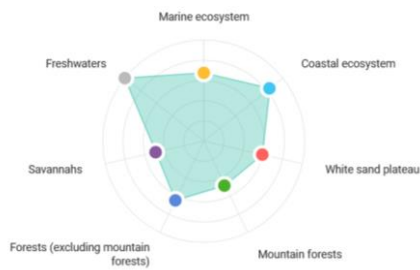
Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

Sector **Mining** Tourism
gas oil Agri
Agriculture Forestry

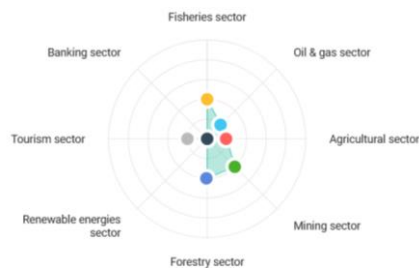
Classify the ecosystems, starting with those most affected by the activities of your sector

- 1 Freshwaters
- 2 Coastal ecosystem
- 3 Marine ecosystem
- 4 Forests (excluding mountain forests)
- 5 White sand plateau

6 Mountain forests ; Savannahs



On the selected ecosystems, which other sector could be seen as a competitor?



BOARD

Which activity impacts the **marine ecosystem**?

Shipping of Rice and Sugar
Pesticide applications
Drainage

What are the **impacts**?

Noise
Runoff from rice and sugarcane fields are drained into the marine environment and the contain residues from pesticides, herbicides, etc which cause pollution

Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?

Annual certification

Which activity impacts the **coastal ecosystem**?

Planting and land preparation activities possible emissions from factory
Poor Drainage

What are the **impacts**?

Air pollution
Flood

Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?

Pressure from local residents
Compensation for drainage activities that support residents

Which activity impacts the **freshwaters ecosystem**?

Agrochemical usage
Monoculture

What are the **impacts**?

Pollution from agrochemical residue
Loss of biodiversity
Removal of other surrounding plants

Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?

Incentive to use biopesticides
Better farm price for using biopesticides
Organic products obtaining better prices
These are ideas that need to be put in place
Intercropping and integrated farming

Which activity impacts the **forest ecosystem**?

Clearing forests to make space for farm land

What are the **impacts**?

Risk of deforestation

Does any incentives exist to **mitigate (or boost if positive)** this impact at your sector's scale?

Develop policy to ensure the reduction in the use of agro-chemicals

Which one ?

à 4 personnes il y a 2 jours

Unchained

27 oct

All of them. Especially pesticides which are over used by many.

Répondre...

What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

- Consumer awareness
- Organic food prices

Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Zone planning for agricultural districts so as to not upset the existing biodiversity or have minimal impact on it
- Reduce the use of agrochemicals
- The Agri Sector can formulate and implement the necessary policy framework to mainstream Biodiversity in the day-to-day agri activity. Also the developing of the necessary legislation.
- Drainage and irrigation compliance with regulatory framework
- Using more bio-friendly pest control methods

Willingness to participate to phase 2 : not relevant, not enough participant.

Comments :

- It is crucial to focus on the conservation and use of Bioversity, also the sharing of the benefits derivrd from such resources.
- Interest in seeing the initiatives that emanate from this first phase and other areas Interest in biodiversity and improvement in environment

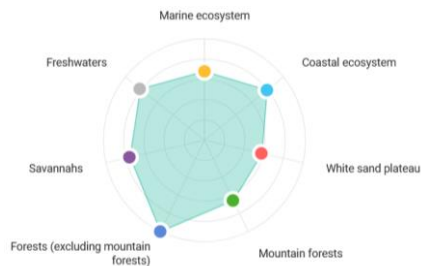
Tourism sector

Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

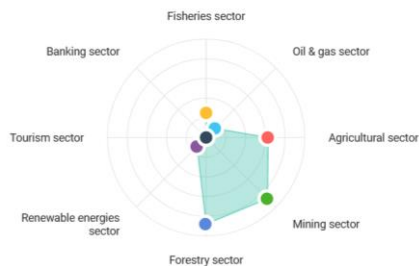
oil&gas Oil **Mining** gold
Tourism **Forestry** gas Agriculture

Classify the ecosystems, starting with those most affected by the activities of your sector

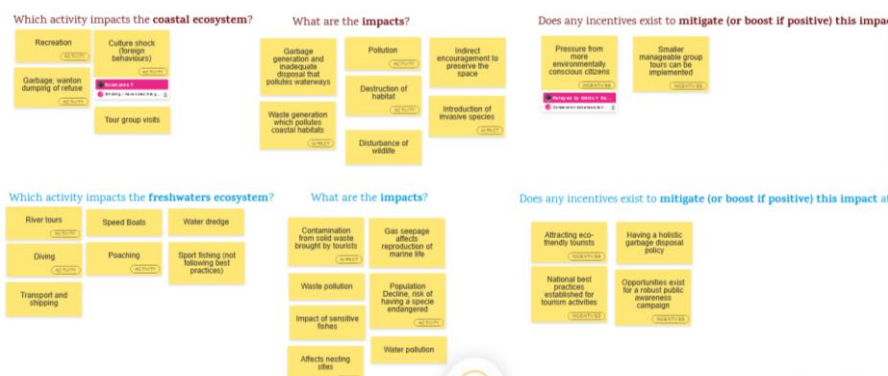
- 1 Forests (excluding mountain forests)
- 2 Freshwaters
- 3 Coastal ecosystem
- 4 Savannahs
- 5 Marine ecosystem
- 6 Mountain forests
- 7 White sand plateau



On the selected ecosystems, which other sector could be seen as a competitor?



BOARD



Examples ?

à 3 personnes à y a 2 jours

Ember 27 oct.

excessive drinking, fights/brawls, provocative clothes (Guyana is more conservative)

27 oct.

Ok so which are indirectly impacting biodiversity by excess (noise, pollution, plastic waste, etc...)

Kamrul Baksh 27 oct.

Smoking, I have noted that guides are heavily influenced by the Western Culture

Relayed by NGOs ? Does ecotourism companies works with NGOs?

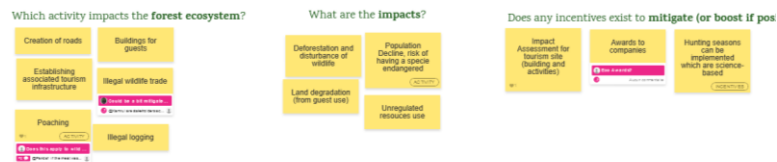
à 3 personnes à y a 2 jours

Ember 27 oct.

There are some collaboration with tourism operators on specific projects.

Kamrul Baksh 27 oct.

Conservation societies also help, you have several programmes in the Rupununi aimed at this.



Could be a bit mitigate by the SWM project maybe
à 4 personnes à y a 2 jours

Does this apply to wild meat dishes served to tourists?

Kamrul Baksh 27 oct.
In part, I was referring to the ongoing poaching of wildlife which was devastating impacts on the resources.

Unchained 27 oct.
Agreed!!

@Panda1 if the meat was obtained through illegal means, I would say yes

Aren't savannah fires natural? Are you referring to fires that might be intentionally set by visitors or started accidentally?

its a traditional practice, mostly done by locals, but there is a gap not being pass on to upcoming generations as to the timing when these fires should be set. also some time is done willfully

Unchained 27 oct.
This is a good point. I forgot about this one. So tourism can also drive this?

Kamrul Baksh 27 oct.
Savannah Fires are mostly intentional, for farming, and other done out of mischief.

Kamrul Baksh 27 oct.
SWM is part of the solution, not all encompassing. Its very difficult to contact the illegal wildlife trade The Commission is working on a proposal to tackle this.

Mike 27 oct.
also the THAG i think

27 oct.
How could the tourism industry help in that sense ?

Unchained 27 oct.
@Kamrul are stakeholders actively involved in the crafting of those documents?

how so,

Kamrul Baksh 27 oct.
Birding tours if not done properly, can be intrusive, destruction of habit, etc. I'll give examples

Unchained 27 oct.
@Kamrul I totally agree with you

What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

- Education, diverse opportunities
- Incentives using best tourism practises
- Development of the oil and gas sector

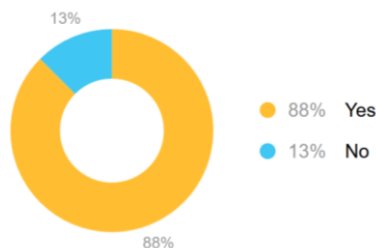
Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Follow national/acceptable standard for how to operate in the tourism sector
- Train tour guides about biodiversity so that they can carry out their duties with biodiversity in mind
- Potentially award practices that directly maintain biodiversity since other awards are promoted in the sector
- Source food, transportation and other services from sources that are committed to sustainable practices that positively impact Biodiversity.
- Education and outreach, stakeholders consultation and collaboration
- Stakeholder Engagement

Willingness to participate to phase 2 : not relevant, not enough participant.



Comments :

- Tourism sector is growing in Guyana, with so many of the existing positive impacts on biodiversity the sector should be supported and incentivized to continue on this path especially now that the market stands to expand further
- Very informative and interactive session but i think participants should be abreast on the outline of the workshop so that they can be better prepare to participate and contribute
- Tourism does have its negative impact on biodiversity, but not nearly as comparable to mining, forestry, agriculture sectors, I feel its best that the sector that create widespread damage be shortlisted.

Fisheries sector

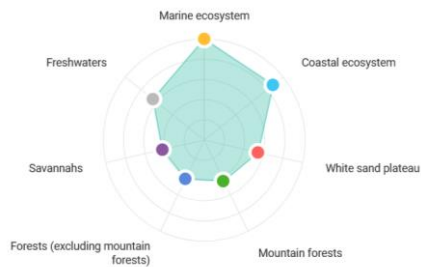
Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)



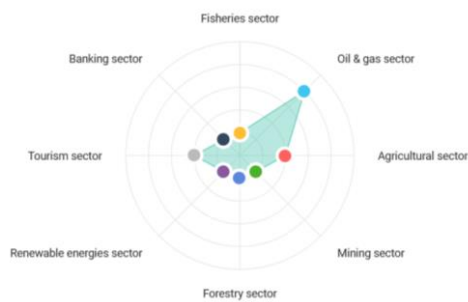
Classify the ecosystems, starting with those most affected by the activities of your sector

- 1 Marine ecosystem
- 2 Coastal ecosystem

- 3 Freshwaters
- 4 White sand plateau
- 5 Mountain forests
- 6 Forests (excluding mountain forests) ; Savannahs

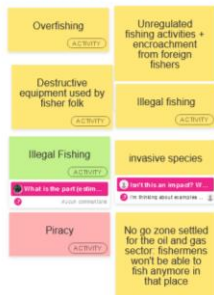


On the selected ecosystems, which other sector could be seen as a competitor?

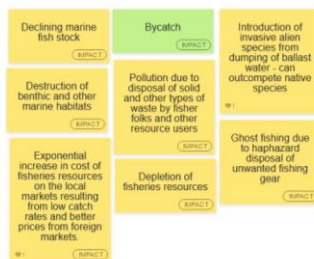


BOARD

Which activity impacts the **marine ecosystem**?



What are the **impacts**?



Does any incentives exist to **mit**?



Isn't this an impact? What is the activity that caused the introduction of the invasive species?

28 oct

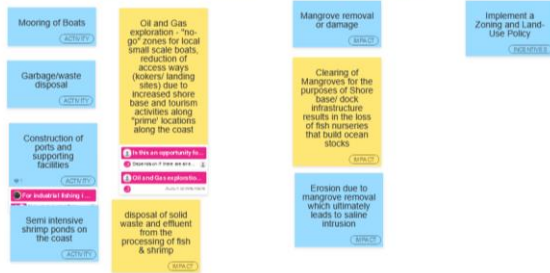
Which alien species are you thinking about ?

28 oct

Panda1

I'm thinking about examples such as African catfish. Depends on the species that the sector decides to farm in the future.

Which activity impacts the coastal ecosystem? What are the impacts? Does any incentives i



For industrial fishing i guess ?

2 persones 8 y a 21 heures

Unchained

28 oct.

Not only industrial fishing. Many ports/shore bases are planned for the oil and gas industry which would cause mangrove deforestation.

Is this an opportunity for those areas to become spawning sites?

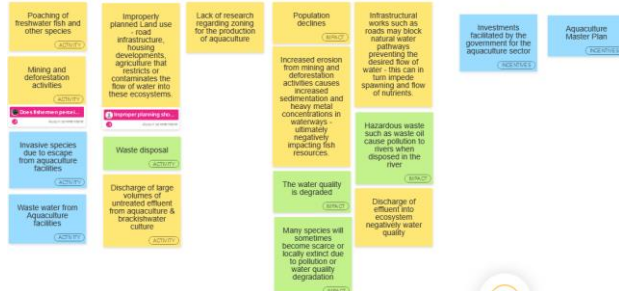
Anna

28 oct.

Depends on if there are already mature mangrove forests there

Oil and Gas exploration should be the activity and the impact should be "creation of "no-go" zones for local small scale boats, reduction of access ways (kokers/ landing sites) due to increased shore base and tourism activities along "prime" locations along the coast"

Which activity impacts the freshwater ecosystem? What are the impacts? Does any incentives exist to mitigate



Improper planning should be the activity and "road infrastructure, housing developments, agriculture that restricts or contaminates the flow of water into these ecosystems" is the impact

What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

- | | | |
|---|---|---|
| 1 | Better-informed consumers | 0 |
| 1 | Compensation from Oil & Gas Sector | 0 |
| 1 | International Pressure | 0 |
| 1 | Pressures from International Organizations to develop more sustainable fisheries (eg, MSC) | 0 |
| 1 | The development of the oil and gas sector | 0 |
| 1 | The development of the tourism sector which might develop and the oil and gas sector develops | |

Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- If the proper regulatory and policy incentives are provided this will certainly assist in this regard
- To ensure that all vessels have adequate exclusion devices, appropriate fishing gears, follow any stipulated fishing seasons, avoid marine protected areas and return to sea species that are threatened.

Willingness to participate to phase 2 : not relevant, not enough participant.

Comments :

- Compliance monitoring needs to be improved in the fisheries sector

Renewable energies sector

Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

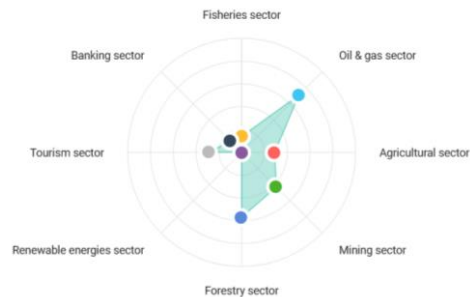


Classify the ecosystems, starting with those most affected by the activities of your sector

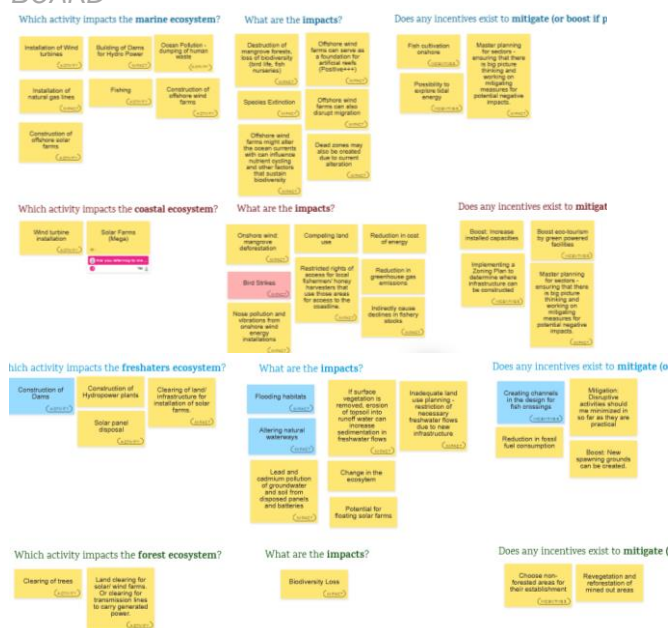
- 1 Coastal ecosystem
- 2 Forests (excluding mountain forests)

- 3 Marine ecosystem ; Freshwaters
- 4 White sand plateau
- 5 Savannahs
- 6 Mountain forests

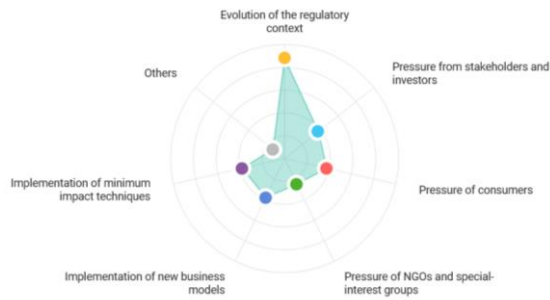
On the selected ecosystems, which other sector could be seen as a competitor?



BOARD



What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

- Better informed consumers
- Changes in the oil and gas demand
- Experience of the degradation of sections of environment
- International Commitment at a national level (eg : kyoto, COP26)
- Political will
- Sector commitments
- Standards implementation

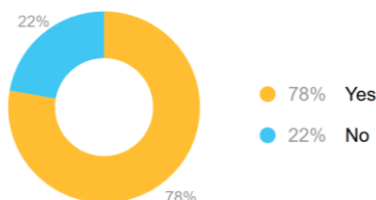
Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- Prepare a bill and have it presented to the parliament.
- Agree in principle that infrastructure related to renewable energy be constructed with biodiversity in mind to ensure minimum negative impacts.
- To always include an environmental impact assessment in projects to determine level of impact on the environment and possible mitigating measures.
- Utilize technologies and techniques to minimize negative bio-diversity impacts.
- Replanting of trees what were harvested

Willingness to participate to phase 2 : not relevant, not enough participant.



Mining sector

Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

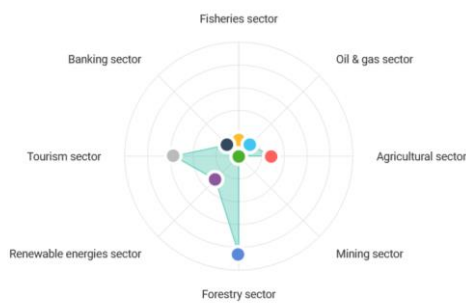
Agriculture and Mining Forestry

Oil Gas and extractive Mineral industry gold

Classify the ecosystems, starting with those most affected by the activities of your sector

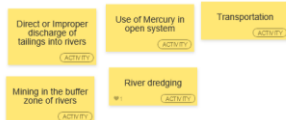
- 1 Forests (excluding mountain forests)
- 2 Freshwaters
- 3 White sand plateau
- 4 Mountain forests
- 5 Marine ecosystem
- 6 Coastal ecosystem
- 7 Savannahs

On the selected ecosystems, which other sector could be seen as a competitor?

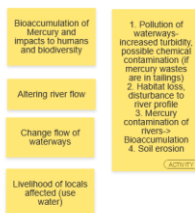


BOARD

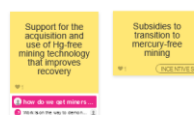
Which activity impacts the **freshwaters ecosystem**?



What are the **impacts**?



Does any incentives exist to **mitigate**?



how do we get miners to adapt these once they work? it often takes a while

Curtis
Work is on the way to demonstrate the effectiveness of the equipment and help with the transition

Which activity impacts the **forest ecosystem**?



What are the **impacts**?



Does any incentives exist to **mitigate (or boost if p**



What is the impact of not prospecting?

Curtis 15:49
Clearing of forests without producing mineral, increasing deforestation.

Arapaima 15:53
loss of investments

Which activity impacts the **white sand plateau ecosystem**?



What are the **impacts**?

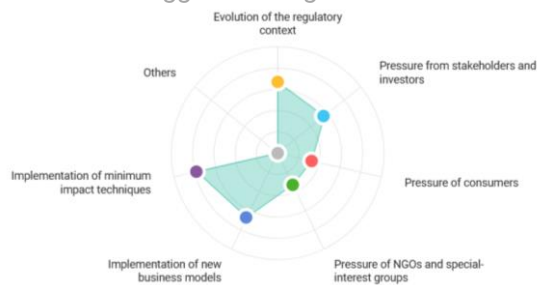


Does any incentives exist to **mitigate (or boo**

should be in the freshwater section



What could trigger a change to better mainstream biodiversity in your sector ?



Other triggers of change

testimonials of what works from peers

Collaboration with Tourism

Developmental agendas

Political climate

Sector commitments

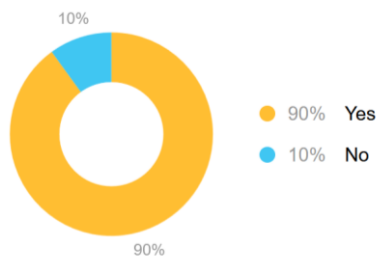
Is the sector structured enough to make voluntary commitments (several answers possible) ?



What commitment would the sector be willing to make to enhance biodiversity mainstreaming in its regular activities?

- To have the most environmentally friendly practices implemented with the understanding that added income would be possible by marketing the products in that way.
- Establish biodiversity reserves
- Use of new technologies that improve recovery.
- Promotion of technology that allow greater recovery efficiency, so that mine closure can be realised. Greater emphasis on operations undertaking mine reclamation best practices.
- Collaboration among regulatory agencies to monitor the impacts of mining, and enforce where necessary, on land and waterways.
- Increased institutional and stakeholder commitment

Willingness to participate to phase 2 : not relevant, not enough participant.



Comments :

- The environmental bond and fines need to be increased in the sector
- To have the mining sector willing to participate in commitments they often require proof of concept/ that it works in their favour

Annex 3: Results from the conservation workshop

Which sector(s) is(are) the most impactful on biodiversity in Guyana (1 or 2 words max)

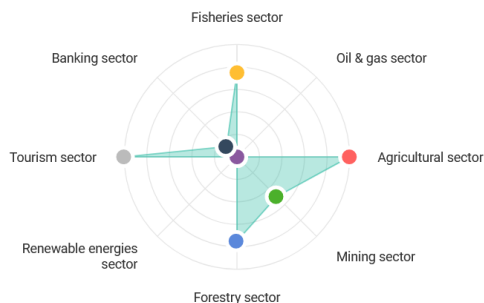


Rank the economic sector according to the strenght of its organisation (ie: actors or groups of economic actors, like unions, research, TFPs, businesses, etc. identifiable)

- 1 Forestry
- 2 Mining
- 3 Agriculture ; Banking
- 4 Oil and gas
- 5 Fisheries
- 6 Tourism
- 7 Renewable energies

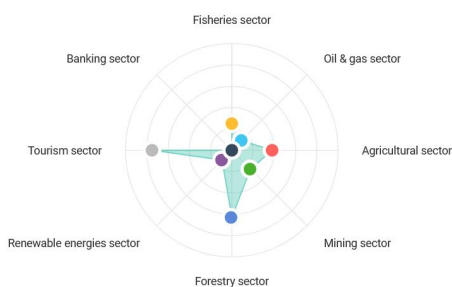
For which sector will the subject ministry be able and willing to facilitate stakeholder mobilization and comitment within the sector?

Tourism, Agriculture, Fisheries, Forestry.



Which sector has most experience in making relevant and voluntary commitments?

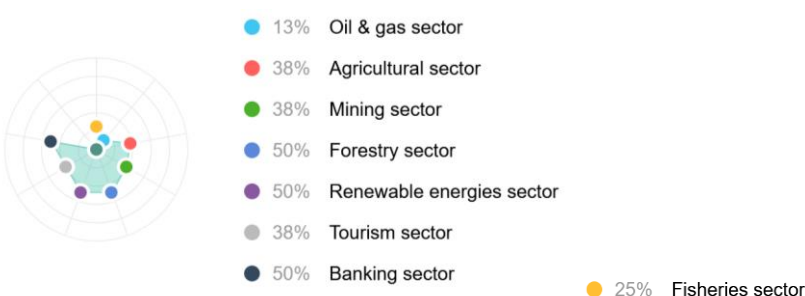
Tourism, Forestry



Which sector has the capacity to trigger a positive change in another sector?

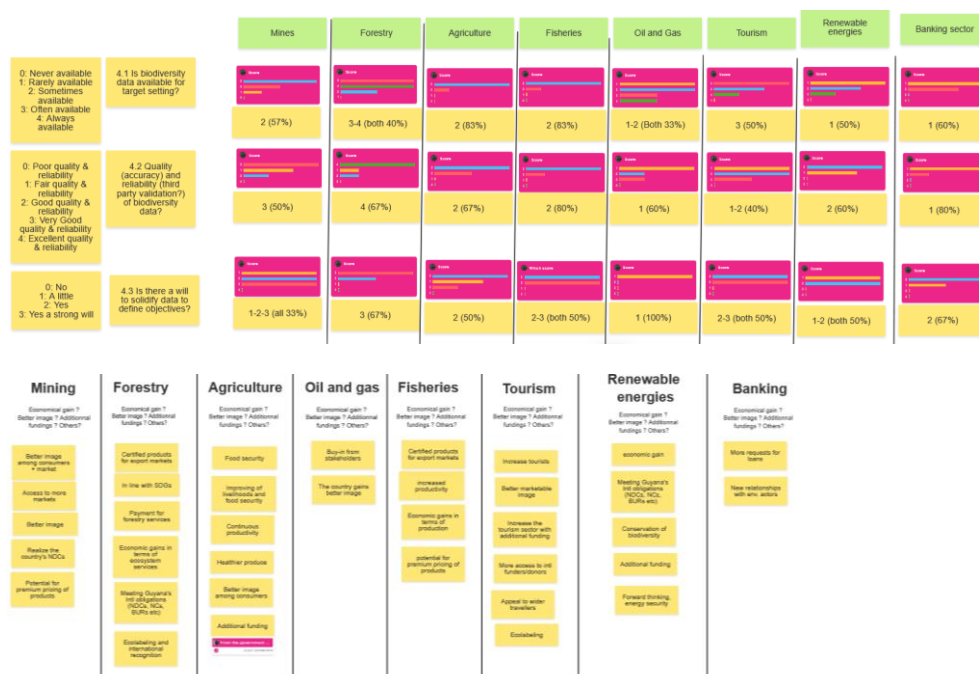
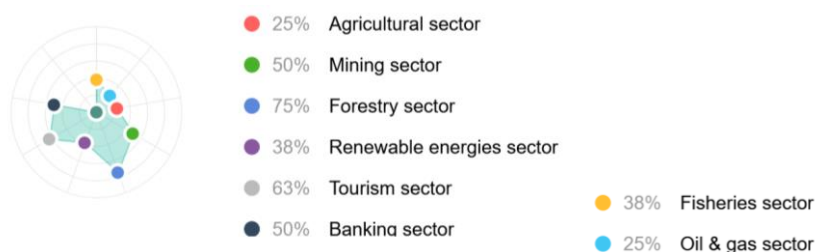
Forestry sector, renewable energies, banking sector (1)
Agriculture, mining, tourism (2)

Oil and gas, fisheries (3)

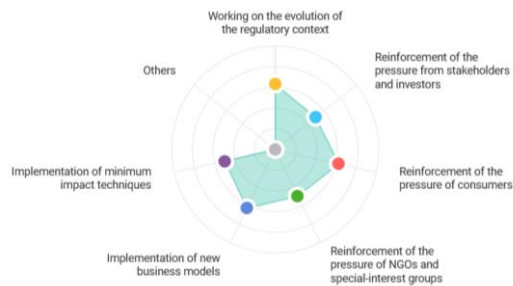


With which sector would you be most willing to work with on the creation of voluntary commitments, to mainstream biodiversity in their activities ?

Forestry, Tourism, Mining, Banking (1) Renewable energy, fisheries (2) Agriculture, Oil and Gas (3)



According to you, what is the best way to trigger a change to better mainstream biodiversity into sectoral activities?



forming coalition on best practices

Improve multi-sectoral engagement, Increase inclusion of IPLC, international trends

Policy reform

Private and civil sectors influences in decision making

What commitment would you like to see emerge from sectors to enhance biodiversity mainstreaming in their regular activities?

- Steps on how they will enforce biodiversity policies
- Collaborative effort
- Those that directly reduce the sectors impact on biodiversity and measures those direct contributions the sectors make
- Ministers involvement
- Biodiversity should become a household name in the economic sectors so that it is always considered whenever any activity is embarked on.

Annex 4: Prioritization process

Cf: Attached document n°1.

Annex 5: List of actors contacted

Cf: Attached document n°2.

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