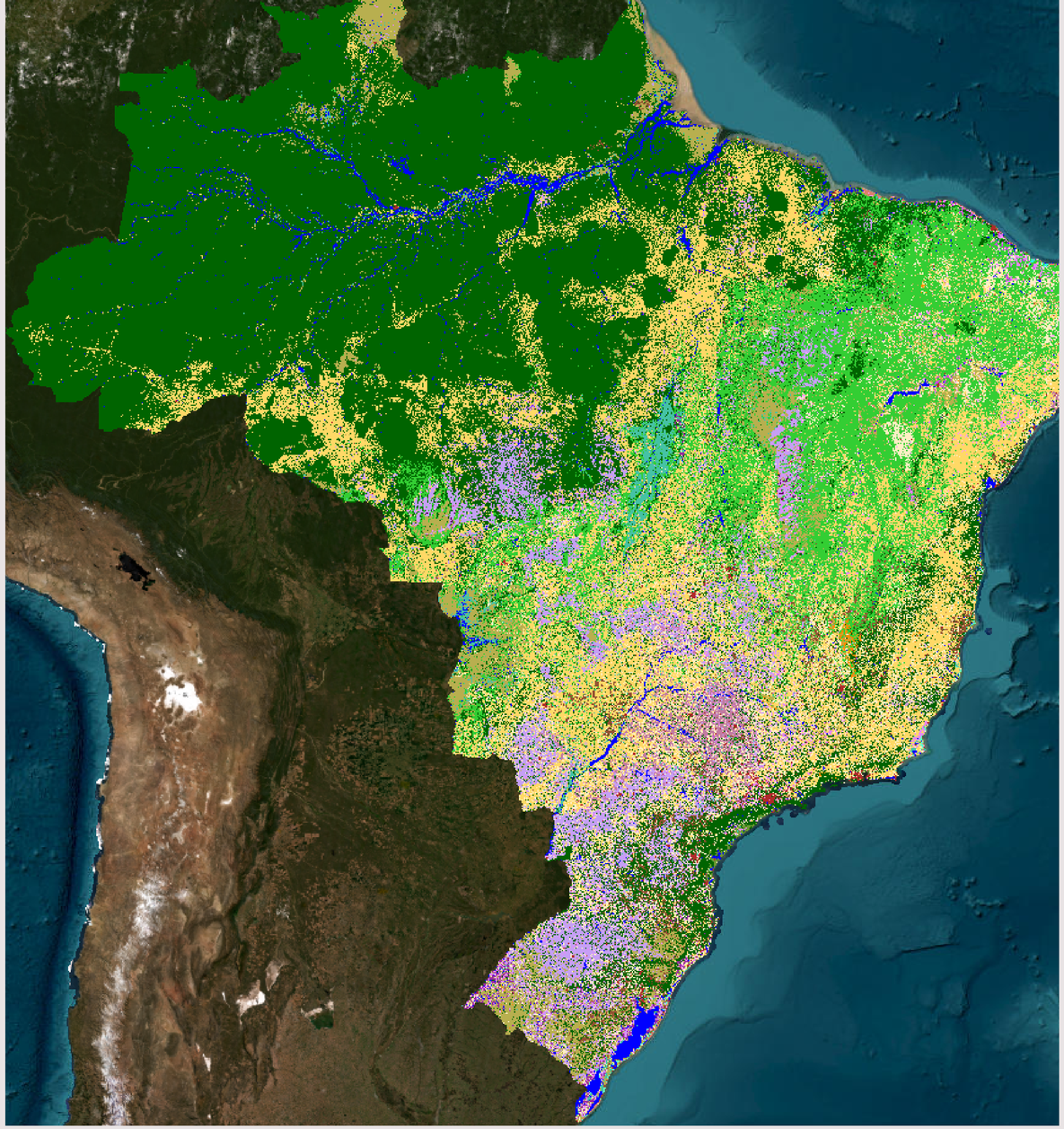
MAPBIOMAS EXTERNAL EVALUATION AND IMPACT ASSESSMENT

SÃO PAULO — JULY 2023



FOREWORD

IT IS HARD TO BELIEVE that MapBiomas is less than a decade old: the intelligence tool is already such an integral part of the Brazilian land-use ecosystem, and is now making an imprint on the way that governments, companies, academia and civil society in Asia and the Americas understand, analyse and respond to changes in land cover and land-use.

In the eight years since MapBiomas was founded, its use and application have grown significantly: in 2022 alone, it counted on a third of a million users. MapBiomas' maps are now utilized by policy makers, agricultural companies, academics, conservationists, bankers and many others for a variety of purposes including land management, conservation initiatives, monitoring and surveillance bodies and policy-making.

If MapBiomas is to continue to grow and fulfil its role as one the leading land-use tools in the world, then understanding how it is used, and the direct and indirect impacts of such use are essential strategic elements of that growth. Consolidating a simple and robust system for monitoring progress and evaluating impact in the medium- and long-terms is also critical.

Having the responsibility for evaluating MapBiomas is therefore both a privilege and a challenge. The intent of this report is, above all, to support MapBiomas in its expansion and in its mission to provide accurate information on land-use and land cover changes in Brazil and beyond. In doing so, it is important to identify what is working well, and what could change, and to review and validate recommendations with the team, so that where they make sense, they can be acted upon.

Just as MapBiomas is a collaborative and open tool, with a relatively flat, network-based approach to management, so the approach to this evaluation has been largely participatory: more than 100 collaborators, partners and users have been directly consulted as part of the review. It is to them, and to the more than 200 MapBiomas collaborators that this report is directed, with the aim of further strengthening and empowering the organization to fulfil its mission.

The Olab Evaluation Team

TABLE OF CONTENTS

Photo: Adam Smigielski / Unsplash

INTRODUCTION AND CONTEXT

1

Photo: Luciano Oldecop / Unsplash

1.1

INTRODUCTION TO THE EVALUATION

The **purpose** of the 2023 MapBiomas external evaluation is to assess the network's impact and propose a functioning system for Monitoring and Evaluation across the network. Impact is understood by MapBiomas to mean improved decision-making on sustainable natural resource management, which itself contributes towards climate change mitigation.

As with any impact evaluation, the question of **attribution** is a thorny one: how is it possible to demonstrate with confidence that the data made available by the MapBiomas network is contributing to sustainable use of natural resources and to climate change mitigation? In short, it may not be possible, but what can be achieved with considerably more confidence is a demonstration of causality: that MapBiomas contributions lead to actions and decision-making by others that themselves lead to positive changes in sustainable natural resource management.

What this **report aims to demonstrate**, then, is firstly the range of products under the MapBiomas umbrella; and secondly the types of users of those products and how they are applied, defined here as 'strategic application'. Once it is clear that, across the board, those strategic applications mean more sustainable management of natural resources in Brazil, then we can say with some confidence that MapBiomas is contributing to climate change mitigation. This causal relationship is illustrated by a number of impact case studies set out in Part 2.

The structure of the report is as follows: Part 1 outlines the scope of the research and provides an explanation of what MapBiomas is and how it works, including the platform's history and coverage; Part 2 draws on the results of interviews and workshops with more than 100 people to explain who uses MapBiomas, why it is used, and the platform's perceived value add – examples of the strategic application of MapBiomas' products serve to demonstrate, in real terms, results and impact; Part 3 sets out a proposal for a robust Monitoring & Evaluation (M&E) System for MapBiomas; while Part 4 provides the results of the institutional evaluation, recognizing that tensions exist in a network of this size, and gives suggestions for managing those tensions as well as identifying future opportunities; and Part 5 summarizes the 17 recommendations set out in the report across four major areas: M&E; Strategy and Engagement; Governance and Funding; and Communication.

In terms of **target audiences**, the report is designed to be read by a general audience with an interest in understanding how MapBiomas works and how it can achieve further impact; it is also intended for funders and partners of the platform, who want to understand whether resource allocation is leading to transformation in the ways decisions are made on sustainable natural resource management. Above all, the report aims to speak to the more than 200 collaborators who make up the MapBiomas network globally, with a view to giving them a vision of how their work contributes to a greater whole, and to invite them to take part in and own an M&E system that will provide long-term strategic oversight of progress towards a common goal.

1.2

SCOPE OF THE EVALUATION

1.2

1.2.1
RESEARCH QUESTIONS

The MapBiomas Evaluation aims to paint a picture of the profile of users, identify the impact that their use is having on sustainable natural resource management, and propose an M&E System for the platform. It also provides an institutional evaluation, with a view to providing recommendations for generating further impact

PART 2

USERS AND IMPACT

What are the type of applications in which MapBiomas has been utilized?

Who has used MapBiomas to date? How has **uptake** been since its inception?

How has MapBiomas data been used to date?

What **impact** has this had on the ground or within organizations/ within government?

What **information** do users feel is **missing**?

How can MapBiomas best **engage with users**?

How can MapBiomas reach **new users**? And ensure existing ones continue to utilize the platform?

PART 3

M&E SYSTEM

What are the options and what would be the best way to **continuously assess** the impact of MapBiomas in research, behaviour, decision-making processes and other policy measures and actions in national and subnational level, businesses, civil society, academia and media concerning the conservation and sustainable management of land, water and biomes?

What could be the **indicators** to be monitored? What are the **baseline values** of these indicators?

What are the **resources** needed to implement the monitoring of impact assessment?

PART 4

INSTITUTIONAL EVALUATION

How can MapBiomas **integrate** with other data sets and mapping systems - governmental and nongovernmental - that also provide information on environmental related topics (e.g. Amazônia Protege, EcoCrime, Do Pasto ao Prato, Selo Verde, etc.)

How can MapBiomas be used to **trigger change on the ground** (eg. stopping illegal deforestation in Brazil)? Does MapBiomas need to take a new direction for the future?

How is the process to **expand** MapBiomas to **other geographies**? What is working? What could be improved?

THE FOCUS OF THE ANALYSIS IS ON USERS AND IMPACT IN BRAZIL,

although the evaluation does include a review of the opportunities and challenges of expanding the platform into new territories

1.2.2 – EVALUATION METHODOLOGY **The MapBiomas Evaluation took place over a three-month period from February to July 2023, and directly involved more than 100 collaborators, partners and users**

FEBRUARY

→ **Desk-based Review (February)**
- 14 documents reviewed
- MapBiomas collections and products
- Internal strategic documents
- Online platform
- Previous evaluations

MARCH

→ **Semi-Structured Interviews**
- 29 one-hour semi-structured interviews
- Brazilian collaborators (17); international network (6); users and funders (6)
- Aimed to assess users, impact and institutional arrangements

→ **Rapid Outcome Assessment Workshops**
- 6 on-line workshops organized by external user groups: government, private sector, academia, other data platforms, NGOs and media
- 2 on-line workshops with MapBiomas collaborators
- Total of 37 participants

→ **Team thermometer Survey***
- 40 of 178 staff replied
- Collaborators' sense of connection and purpose
- Opportunities for professional growth
- Clarity about roles and workload

APRIL

→ **M&E System Workshops**
- 2 on-line workshops with MapBiomas coordinators
- Presentation and revision of process, result and impact indicators
- Total of 15 participants

MAY

→ **Write-up and Delivery**
- Presentation of the draft final report to coordinators
- Revisions and adjustments
- Presentation of the final report

* The Team thermometer Survey was not included in the original scope for the evaluation but was identified as a priority by the Coordination Team

14
documents reviewed

29
one-hour semi-structured interviews

52
participants in on-line workshops

1.3

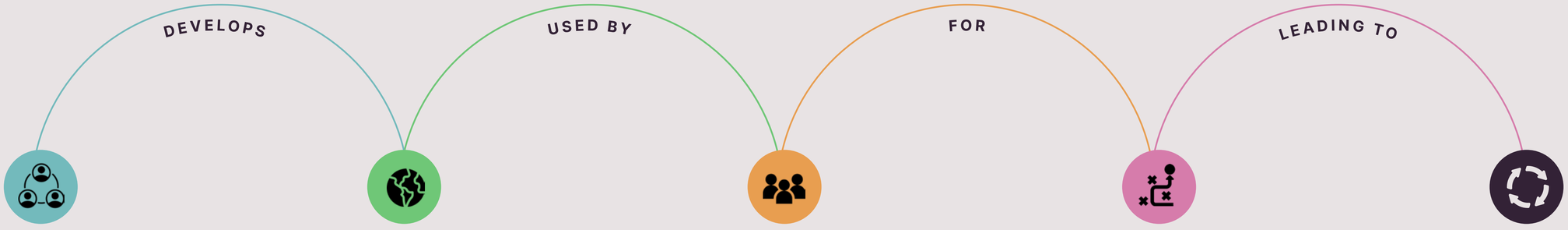
ABOUT MAPBIOMAS

MAPBIOMAS is a collaborative network of more than 70 local organizations, including NGOs, universities, and technology start-ups, that use satellite imagery, machine learning, and cloud computing together with field experience to produce detailed time series mapping of Brazil and in 13 other countries to understand the history of land-use changes in these regions.

MapBiomas collaborators, who are usually embedded in other organizations, have developed methods for classifying land cover and land-use into more than 25 categories, including natural vegetation, agriculture, pasture, urban areas, water bodies, and mining. Together, these collaborators form a network (currently involving some 250 people globally) that forms the basic organizational structure of MapBiomas.

The maps and open codes produced by MapBiomas provide valuable information for policymaking, environmental monitoring and conservation, and sustainable business practices. They allow researchers and policymakers to track changes in land-use and land cover over time and to identify areas of deforestation, land degradation, and biodiversity loss. The maps are freely and openly available to the public and can be accessed through the MapBiomas website.

1.3.1 – WHAT IS MAPBIOMAS? **MapBiomas is a collaborative network that provides users with information on land-use and cover for scientifically informed decision-making**



COLLABORATOR COMMUNITY

MapBiomas is a network of organizations which support MapBiomas through some of its collaborators, who receive regular trainings and support. They are responsible for developing the platform's products.

MAPBIOMAS PRODUCTS

The main MapBiomas products are as follows:

- → Land-use and Land Cover
- → Deforestation Alerts
- → Secondary Vegetation
- → MapBiomas Water
- → MapBiomas Fire
- → Pasture Quality
- → Infrastructure
- → Irrigation
- → Mining
- → MapBiomas Soil

USER COMMUNITY

Key user groups of MapBiomas products are: government, the judiciary, private sector, civil society, financial institutions, academia, the press and media, local communities and the general public.

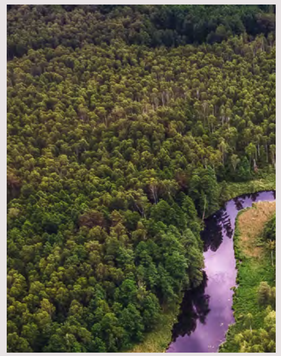
STRATEGIC APPLICATION

Strategic analysis of MapBiomas' maps and data for **land-use planning and policy-making** in the public sector; in the private sector, for the development of **sustainable business practices** including supply chain monitoring, risk management, reporting and conservation initiatives; and by the academic community to **advance scientific knowledge and research.**

IMPACT

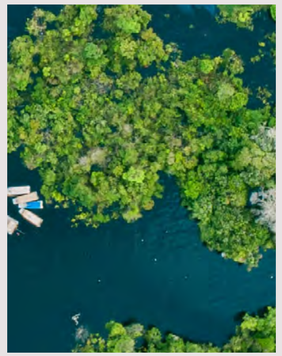
The **purpose** of MapBiomas is to leverage a positive impact by decision makers on **sustainable management of natural resources, climate change mitigation and adaptation.**

2015



LAUNCH OF THE BETA COLLECTION:
7
classes
2008-2015

2017



2ND COLLECTION
13
classes
2000-2016

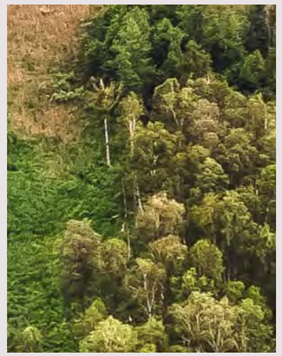
MAPBIOMAS PANAMAZONIA

2018

3RD COLLECTION
19
classes
1985-2017

MAPBIOMAS ARIDAS

2019



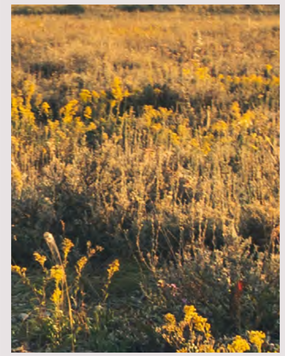
4TH COLLECTION
19
classes
1985-2018

MAPBIOMAS ALERT

MAPBIOMAS ANNUAL DEFORESTATION REPORT

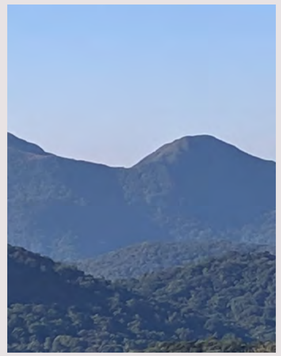
CHACO 1ST COLLECTION:
15
classes
2000-2018

2020



5TH COLLECTION
21
classes
1985-2019

2021



6TH COLLECTION
25
classes
1985-2018

WATER AND FIRE 1ST COLLECTIONS

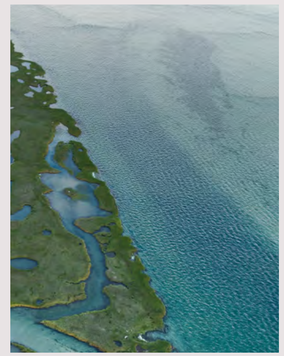
MAPBIOMAS GEOCOVID

INDONESIA 1ST COLLECTION:
12
classes 2000-2019

ATLANTIC FOREST 1ST COLLECTION:
18
classes 1985-2020

PAMPA 1ST COLLECTION:
8
classes 1985-2020

2022

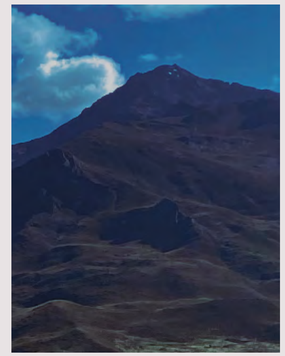


7TH COLLECTION
27
classes
1985-2021

DEFORESTATION Surveillance Monitor

REMOTE EMBARGOES GOOD PRACTICES GUIDE

2023



8TH COLLECTION
29
classes
1985-2022

MAPBIOMAS SOIL (BETA COLLECTION)
1985-2021

MAPBIOMAS PERU

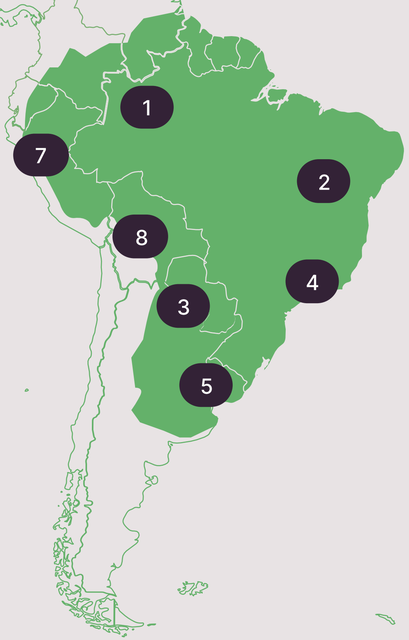
MAPBIOMAS BOLIVIA

1.3.2 – MAPBIOMAS TIMELINE

Launched in 2015, MapBiomas has now reached its 8th Collection, covering the period from 1985 - 2022

1.3.3 – GEOGRAPHIC AND THEMATIC SCOPE

The MapBiomas Network: where and what



8

initiatives

1. Amazon
2. Brazil
3. Chaco
4. Atlantic Forest
5. Pampa
6. Indonesia
7. Peru
8. Bolivia

14

countries

Cover over

50%

of tropical biomes

MapBiomas Network

26

signed Techical Cooperation Agreements

190

collaborators in MapBiomas Brazil

247

collaborators in the global MapBiomas network

Collaborators embedded in

74

diferent institutions

Over

300

people have been collaborators in the Brazil project since 2015

1.3.4 – COVERAGE: USERS, ACADEMIA

Across a series of metrics, MapBiomas coverage continues to grow significantly

+3,165

MEDIA INSERTIONS IN 2022 (16% INTERNATIONAL NEWS)

MapBiomas Alert, May 2023:

53,585 USERS

4,411 registered users

235 institutions

82 customized users*

*Users who can customize Alert reports including use their own institution logo

A total of:

1,611

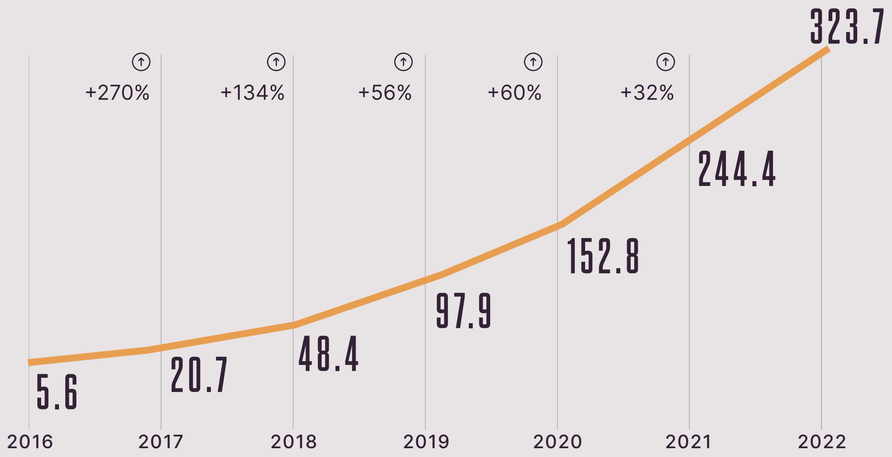
academic peer-reviewed articles published between 2017 and March 2023, using MapBiomas data in more than

350
diferent scientific journals

21
academic articles co-authored by the MapBiomas team

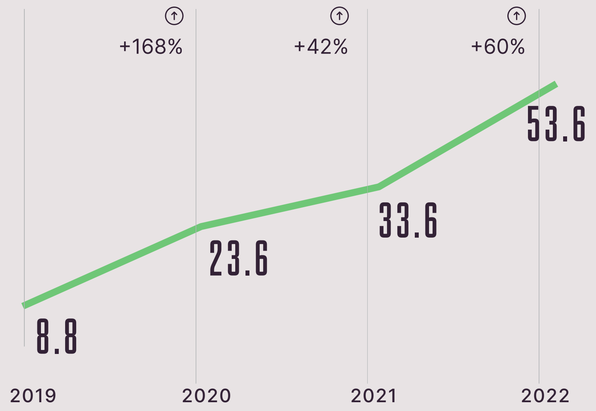
MAPBIOMAS SITE USERS

(1000s, 2016-2022)



MAPBIOMAS ALERT USERS

(1000s, 2019-2022)



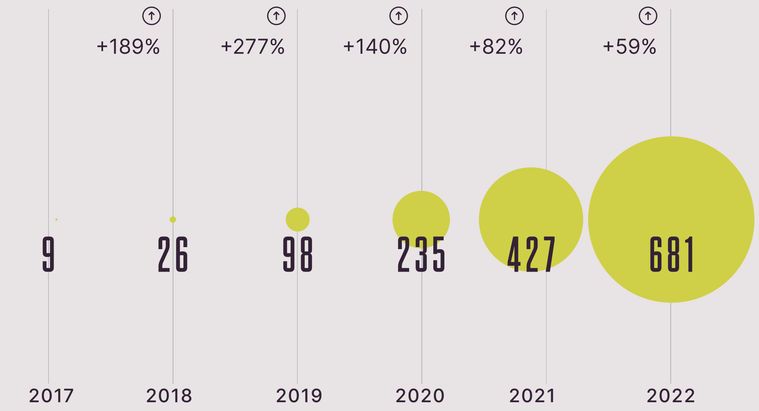
0.8 registered users

1.6 registered users

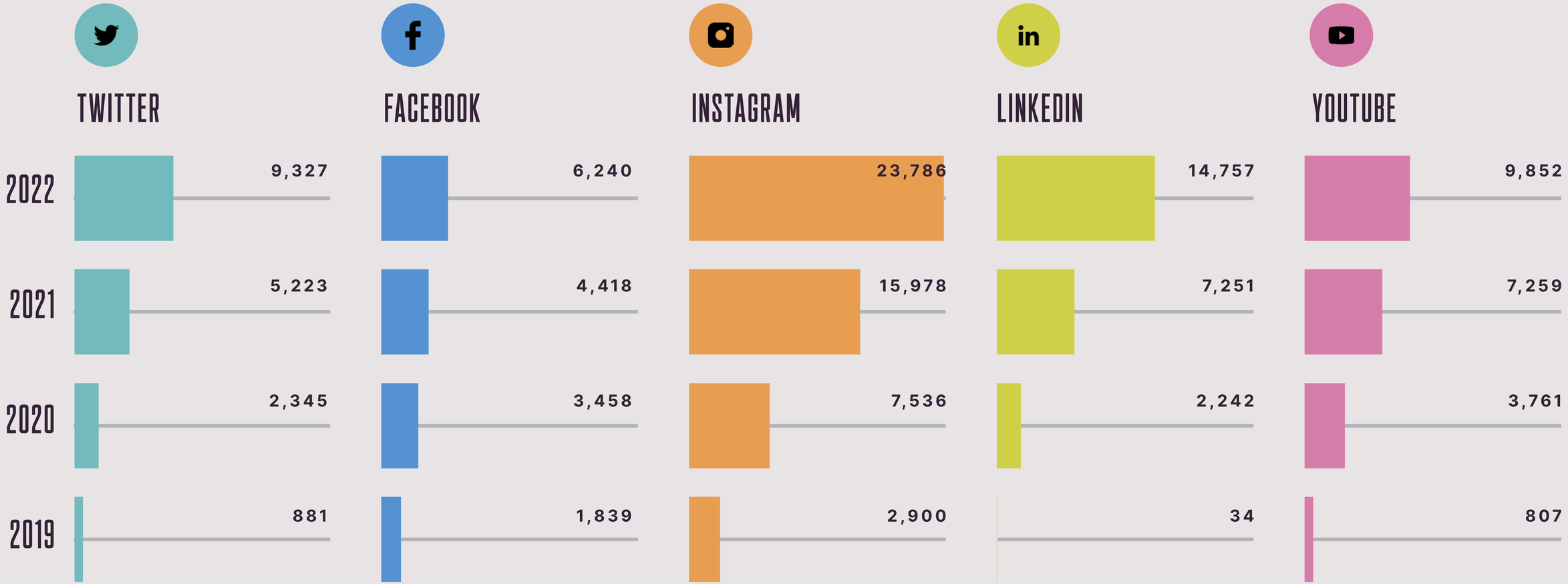
3.2 registered users

ACADEMIC ARTICLES

published with MapBiomas data (2017-2023)



MapBiomas Coverage on Social Media continues to grow significantly



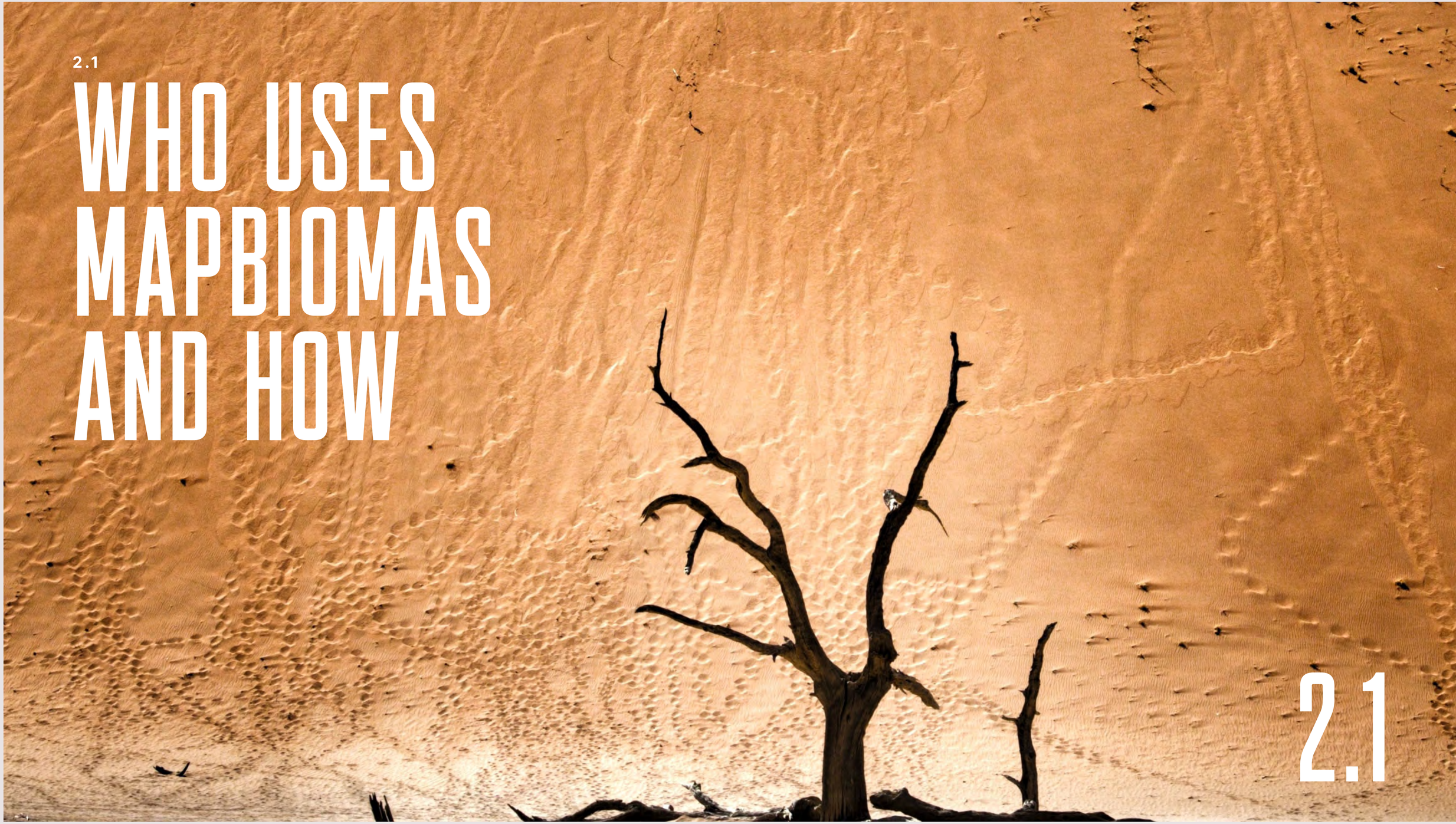
USERS & IMPACT

2

Photo: Bernd Dittrich / Unsplash

2.1

WHO USES MAPBIOMAS AND HOW



2.1

2.1.1 USERS, USE AND APPLICATION **The evaluation identified seven main user groups of the platform, who principally access ten different MapBiomas products for a range of strategic applications**

MAPBIOMAS PRODUCTS

- → Land-use and Land Cover
- → Deforestation Alerts
- → Secondary Vegetation
- → MapBiomas Water
- → MapBiomas Fire
- → Pasture Quality
- → Infrastructure
- → Irrigation
- → Mining
- → MapBiomas Soil
- → RAD (Annual Deforestation Report)

USERS

- → Government
- → Public Prosecutor's Offices and the Judiciary
- → Businesses and Industry
- → Financial Institutions
- → NGOs and International Organizations
- → Academia
- → Media

STRATEGIC APPLICATION

- → Public Sector Policy
- → Land-Use Surveillance & Monitoring
- → Land-Use Planning
- → International Trade Agreements
- → Supply Chain Monitoring
- → Business Opportunity and Risk Management
- → Sustainable Natural Resource Management
- → Capacity Building on Land-Use Technology
- → Evidence-based public debate and exchange
- → Advance scientific knowledge and research

IMPACT

→ Sustainable Management of Natural Resources (biodiversity, soil, water)

→ Climate Change Mitigation and Adaptation

2.1.2 USER SATISFACTION Users, both technical and non-technical, reported a high level of satisfaction with MapBiomas, giving an average score of 8.49 out of 10

GENERAL SATISFACTION
WITH MAPBIOMAS
TOTAL AND BY USER PROFILE

- Heavy Users* (n=58)
- Academia (n=31)
- Media (n=2)
- Technical User (n=62)
- Non-technical User (n=12)
- Influencers** (n=8)
- Manager – Final User (n=9)

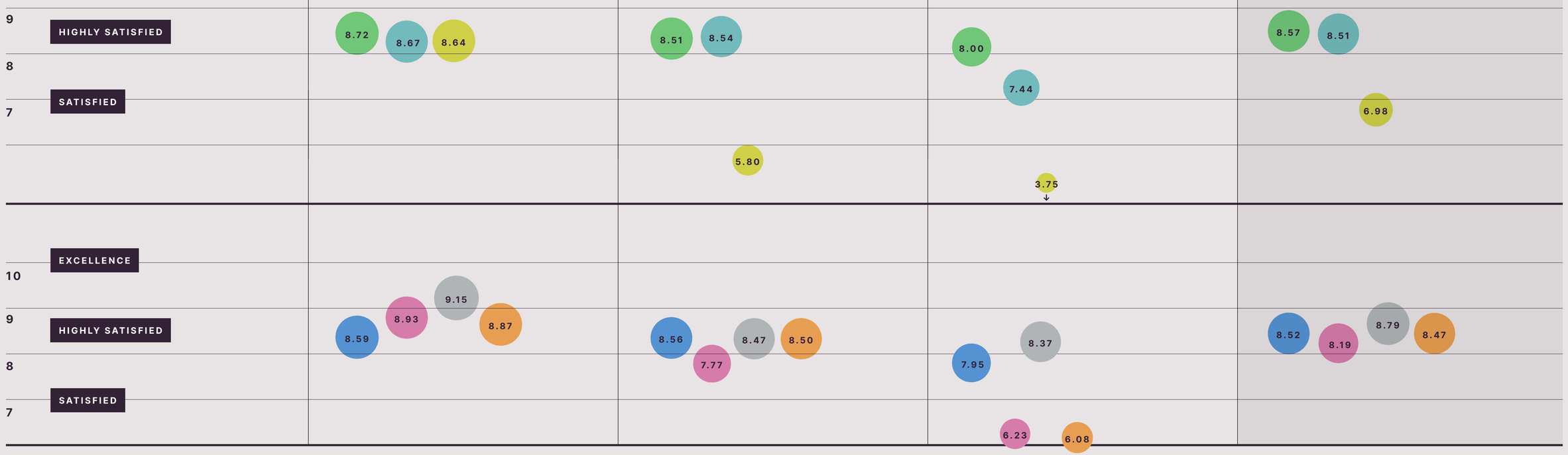
NB: given the small sample size, results for the media are not representative

Satisfaction with Contents (Modules)
AVERAGE
8.70

Satisfaction with Functionality and Tools
AVERAGE
8.44

Satisfaction with Relations and Communication
AVERAGE
7.63

General Satisfaction with MapBiomas
AVERAGE
8.49



Results from 91 MapBiomas users who responded electronically to: "We would like to evaluate your level of satisfaction with the products and functionality of MapBiomas. Use a scale of 1 to 10 to provide your evaluation". Source: '5D - Estratégia de engajamento Fase 1: Pesquisa de mercado quantitativa', December 2022

*Heavy Users are those with a deep understanding of the technology and environmental issues, that use MapBiomas regularly ** Influencers are senior executives who encourage use of the tool by others

Results may differ slightly from the Rapid Outcome Assessment workshops carried out by Olab in 2023 as part of this study.
Slightly lower levels of satisfaction were reported around community relations and communication, particularly by non-technical users (average score 6.23)

2.1.2 USER SATISFACTION: EVALUATION OF CONTENT **Evaluation of MapBiomas' content was also high, scoring an average 8.7 out of 10**

GENERAL SATISFACTION WITH MAPBIOMAS TOTAL AND BY USER PROFILE

- Technical User
- Non-technical User
- Influencer
- Manager – Final User

EXCELLENCE (10) · HIGHLY SATISFIED (9) · SATISFIED (8) · 7

Deforestation
AVERAGE **9.22**

9.16 · 9.45 · 9.25 · 9.17

Land Coverage and Use and Transitions
AVERAGE **8.92**

8.81 · 9.10 · 9.17 · 9.40

MapBiomas Alerts
AVERAGE **8.92**

8.88 · 8.70 · 9.43 · 9.00

Surveillance Monitoring
AVERAGE **8.81**

8.75 · 9.11 · 8.83 · 8.60

Fire Scares (MapBiomas Fire)
AVERAGE **8.71**

8.49 · 9.40 · 9.25 · 8.67

Secondary Vegetation
AVERAGE **8.71**

8.57 · 9.00 · 9.25 · 9.00

Water Surface (MapBiomas Water)
AVERAGE **8.65**

8.56 · 9.10 · 8.50 · 8.33

Infrastructure
AVERAGE **8.57**

8.56 · 8.38 · 9.00 · 9.00

Mining
AVERAGE **8.49**

8.30 · 8.80 · 9.50 · 8.67

Quality of Pasture
AVERAGE **8.40**

8.28 · 8.14 · 10.00 · 8.75

Irrigation
AVERAGE **8.34**

8.12 · 9.00 · 8.50 · 9.00

General Satisfaction with the Content
AVERAGE **8.70**

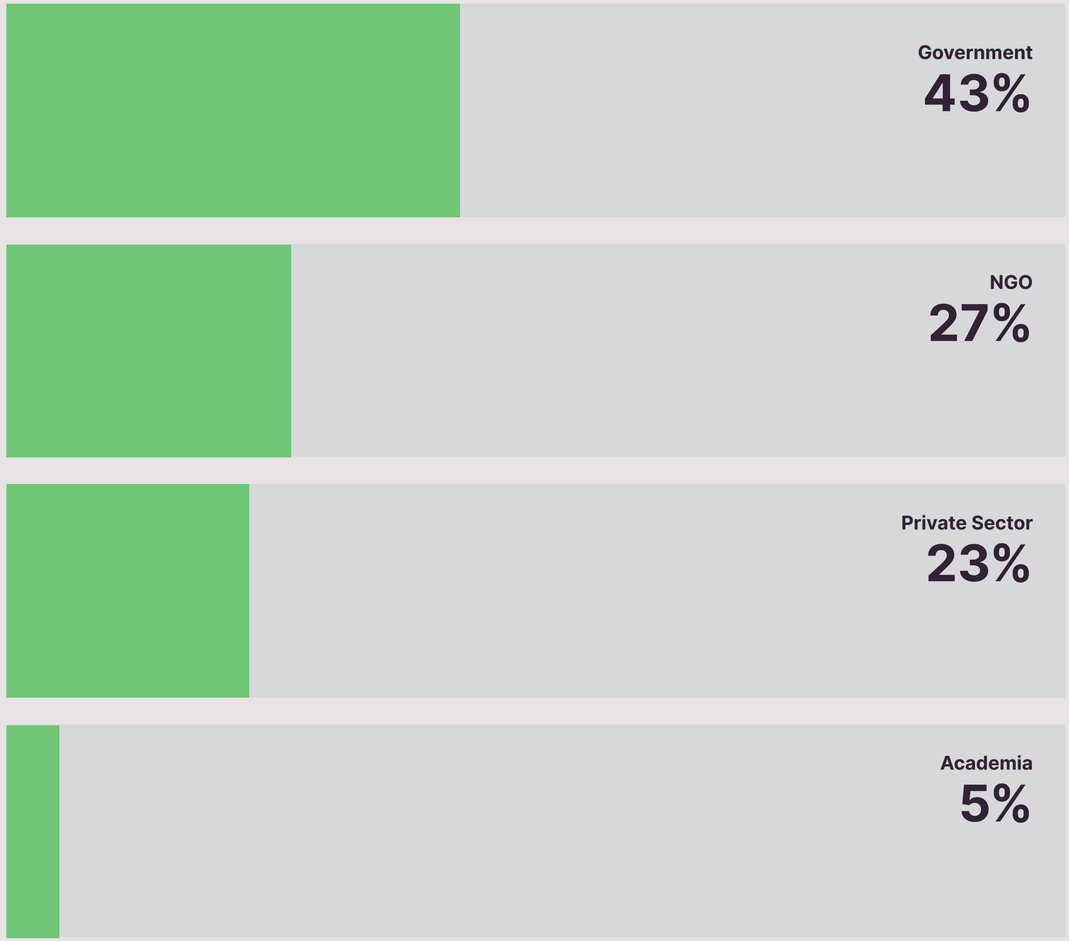
8.59 · 8.93 · 9.15 · 8.87

Results from 91 MapBiomas users who responded electronically to: "We would like to evaluate your level of satisfaction with the products and functionality of MapBiomas. Use a scale of 1 to 10 to provide your evaluation". Source: '5D - Estratégia de engajamento Fase 1: Pesquisa de mercado quantitativa', December 2022

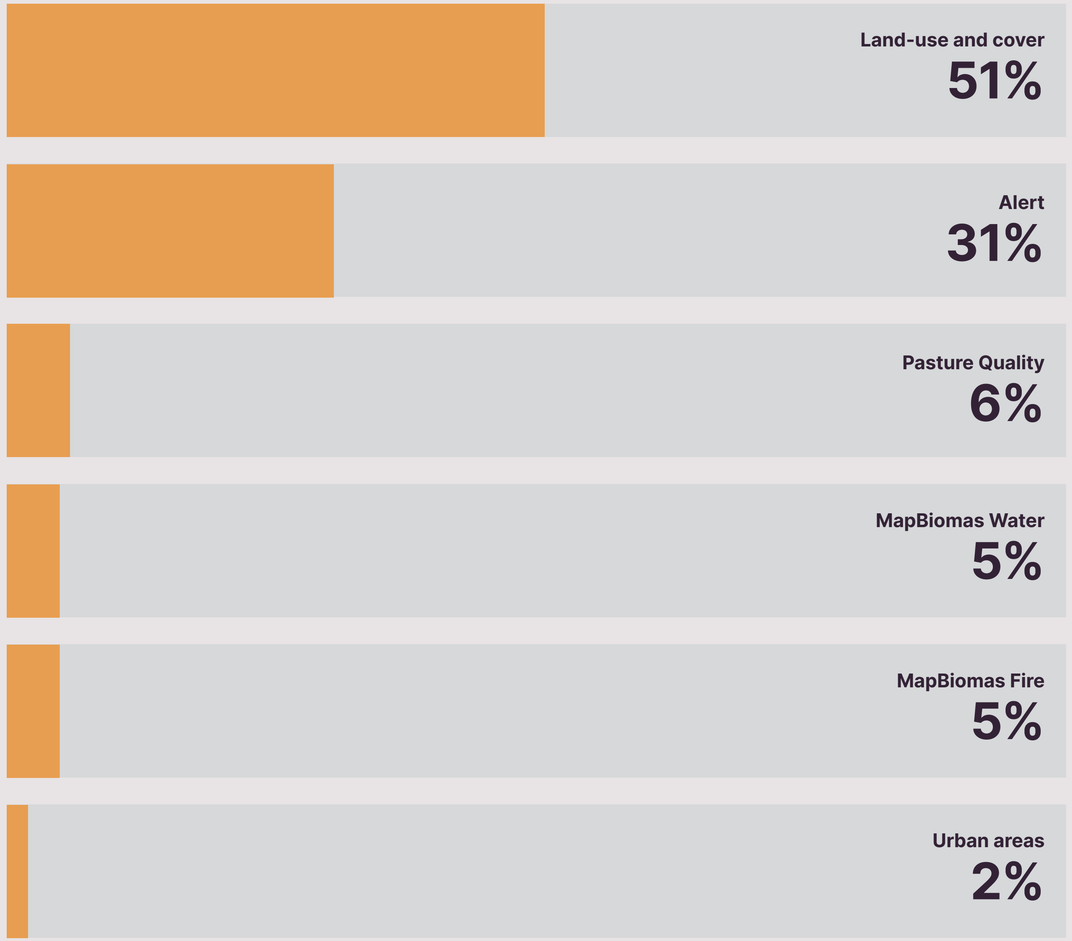
Results may differ slightly from the Rapid Outcome Assessment workshops carried out by Olab in 2023 as part of this study.

2.1.3 – USER DISTRIBUTION FROM STRATEGIC CASES RECORDED BY MAPBIOMAS **From an internal MapBiomas database of cases, there is a strong presence of the government in strategic applications of MapBiomas, with MapBiomas Land-use and cover and Alert as key products**

USER PROFILE FROM CASES RECORDED BY MAPBIOMAS TEAM
(n=90)



MAPBIOMAS PRODUCT USED FROM CASES RECORDED BY MAPBIOMAS TEAM
(n=81)



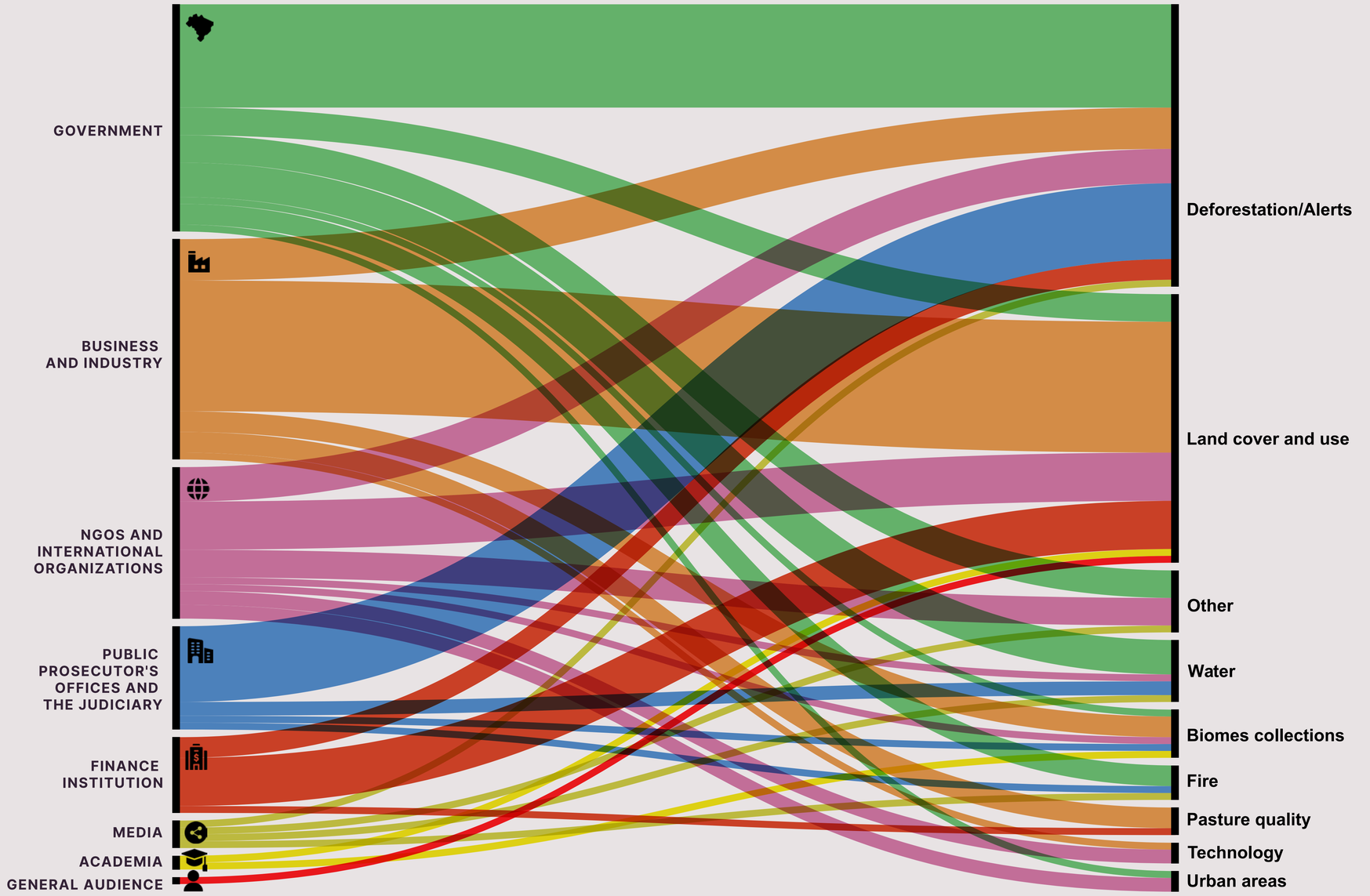
Results may differ slightly from the Rapid Outcome Assessment workshops carried out by Olab in 2023 as part of this study.

Other varied uses were reported summing up 100% of answers

2.1.3 – USE AND STRATEGIC APPLICATION OF MAPBIOMAS

Results from the Rapid Outcome Assessment (ROA) Workshops showed that the main uses of the platform include Land Cover and Use (34%); Deforestation Alerts (33%); and Water (8%)

The MapBiomas main collection on Land Cover and Use is still one of the main products accessed by users (34%). The ROA workshops, however, pointed to a new pattern of use, with increasing participation of government, public prosecutors and the private sector, with MapBiomas Alert deemed a game-changer (33% of use). There is clearly scope for greater uptake by other stakeholders within each group, namely opportunities for involving more banks, traders and state governments. There are also opportunities for greater use of new and promising products such as Water.

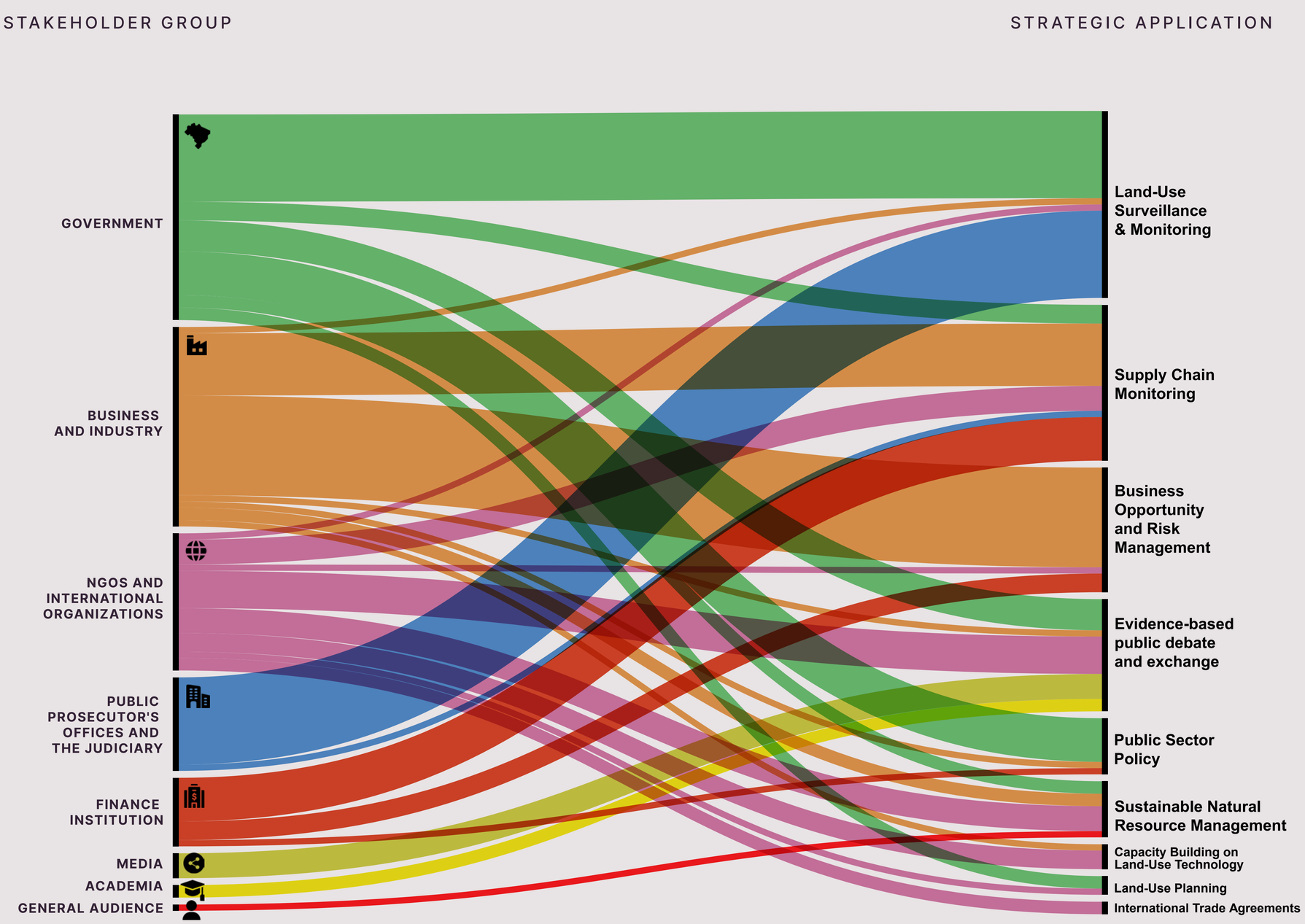


The main uses of MapBiomas products were assessed by means of the six ROA workshops. The involvement of a relatively small number of academics means that this group is under-represented. Results can be complemented by a quantitative survey of 91 users, carried out in December 2022 - see following pages.

2.1.3 – USE AND STRATEGIC APPLICATION OF MAPBIOMAS

The ROA workshops indicate that MapBiomas is now used by decision-makers from the public and private sectors who areare responsible for land-use planning, policy-making and sustainable business practices

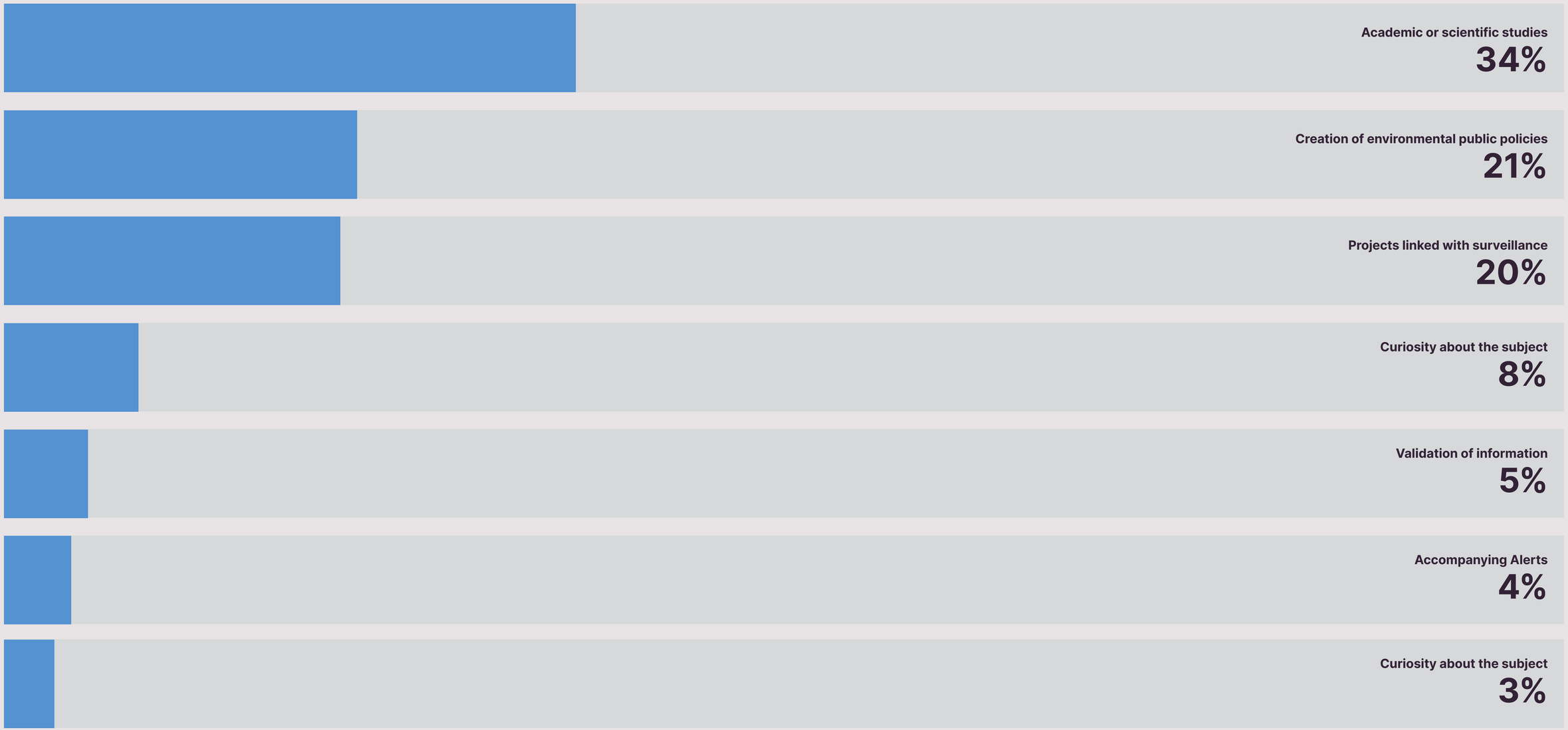
For the public and private sectors, land-use surveillance and monitoring (25%); business opportunity and risk management (17%); and supply chain monitoring (16%) are the main strategic applications. Evidence of increased numbers of technical agreements (an increase of 100% from 2020 to 2021 and of 75% from 2021 to 2022) points to a growing interest and participation by companies, the finance sector, and state and federal governments in using MapBiomas products to make strategic decisions about sustainable natural resource management. MapBiomas continues to be an important source of information for evidence-based public debate and exchange (15%), particularly for NGOs, the media and academia.



2.1.3 USE AND STRATEGIC APPLICATION OF MAPBIOMAS **34% of users reported applying MapBiomas products for academic research; 21% for public sector policies; and 20% for land-use surveillance and monitoring**

PRINCIPAL REASONS FOR MAPBIOMAS USE

Reasons for MapBiomas Use, 2022 (n=91)



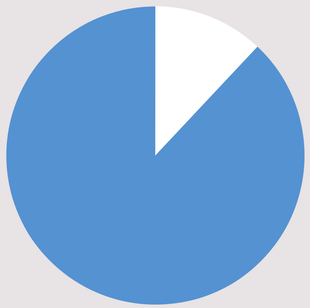
Results from 91 MapBiomas users who were asked: “Considering the majority of your projects, and your day-to-day work, what is the main reason for your use of MapBiomas? Source: ‘5D - Estratégia de engajamento Fase 1: Pesquisa de mercado quantitativa’, December 2022

Others: 5%

2.1.4 PROSPECTIVE USERS OF MAPBIOMAS PRODUCTS **More than 80% of a sample of current users indicated that five MapBiomas products could be used by other potential users**

MAPBIOMAS PRODUCTS WITH POTENTIAL TO REACH NEW USERS

● Yes ● No



DEFORESTATION

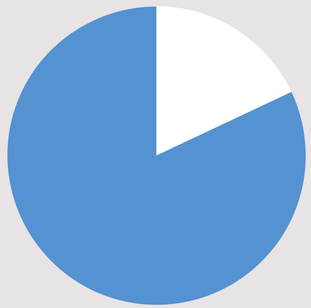
● 87,50% ● 12,50%

MAPBIOMAS ALERT

● 86,96% ● 13,04%

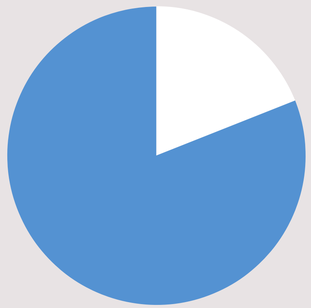
FIRE SCARS (MAPBIOMAS FIRE)

● 82,98% ● 17,02%



SECONDARY VEGETATION

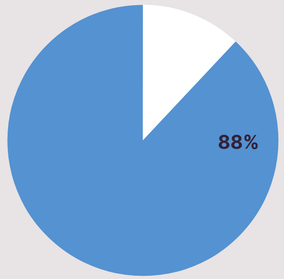
● 82,61% ● 17,39%



LAND COVERAGE AND USE

● 81,63% ● 18,37%

2.1.4 PROSPECTIVE USERS OF MAPBIOMAS PRODUCTS: PROFILE **The functions carried out by prospective users includes: Environmental Management, Legal Compliance, Research and Development and ESG**



DEFORESTATION

Environmental Management **23%**

Research and Development **18%**

GIS **18%**

Legal **16%**

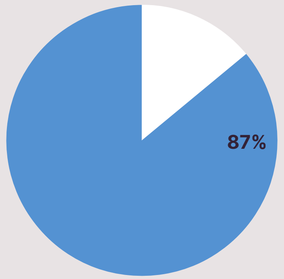
ESG **7%**

Strategic Planning **5%**

International Relations **5%**

Auditing **5%**

Corporate Governance **5%**



MAPBIOMAS ALERT

Environmental Management **29%**

GIS **20%**

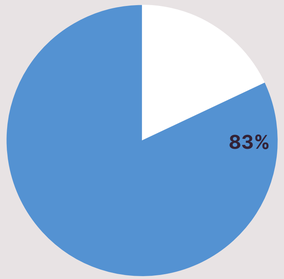
Research and Development **12%**

Legal **12%**

Corporate Governance **5%**

Government Relations **5%**

Strategic Planning **5%**



FIRE SCARS

(MapBiomas Fire)

Environmental Management **38%**

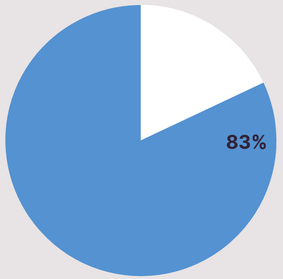
GIS **17%**

Research and Development **15%**

ESG **7%**

Strategic Planning **5%**

Legal **5%**



SECONDARY VEGETATION

Environmental Management **36%**

GIS **18%**

Research and Development **15%**

ESG **8%**

Strategic Planning **5%**

Legal **5%**

Communication and Marketing **5%**

MapBiomas Strategic Application and Impact

MAPBIOMAS PRODUCTS

What products are primarily used?
→ The main Land Cover and Use Collection is still the most accessed MapBiomas product, and is also the one with the largest variety of users.

→ MapBiomas Alert is considered the most innovative product, together with the inspection Monitor, and has been responsible for attracting new audiences that are now understanding the platform and starting to use other products.

→ The Water and Fire Collections have been adopted by some relevant governmental bodies, such as ANA (National Water Agency), However, they are not used as much as the other Collections, in part due to the fact that they are relatively new, but also because some users reported that they do not fully understand their use and features.

USERS

Who uses MapBiomas?
→ Recently, financial institutions and businesses have started using MapBiomas more widely, although this is largely led by “early adopters,” and is not yet standard practice across the sectors.

→ There is evidence that use by federal government bodies has renewed growth under the new administration, while increasing numbers of state governments reported using the platform; this is complemented by the use by Public Prosecutor’s Offices.

→ The use of MapBiomas by academic researchers has grown steadily since it inception, and is the use group most closely connected to MapBiomas, requiring less customization or explanation from MapBiomas in order to make use of information from the website.

STRATEGIC APPLICATION

What are the main Strategic Applications of MapBiomas use?
From the Rapid Outcome Assessments, the main strategic applications of MapBiomas are Portfolio Environmental Risk Assessments and Supply Chain Monitoring:.

→ Public Prosecutor´s Offices and Surveillance Governmental Agencies are checking for deforestation and planning surveillance actions and embargo, as a result, thereby facilitating operations.

→ Commodity traders and producers, like Marfrig, Amaggi and Klabin, use MapBiomas, often coupled with other tools, to monitor their supply chains and plan expansions as part of their business strategies.

→ The use of MapBiomas is often embedded in other services, such as the Agroicone Cattle Risk Map.

Evidence-based public debate and exchange was highlighted by academia and NGOs as an important strategic application of MapBiomas, with other groups also making this point. MapBiomas was the source of science-based proposals by Presidential and political candidates in the 2022 Brazilian elections, and has been used to inform international trade agreements, thereby making headline news on Brazil’s most popular TV channel, Globo.

The use of MapBiomas for planning, both in public policy and governmental bodies and in businesses & industry can still be improved, although its use is already very widespread and varied: MapBiomas was used for public health planning, for identifying locations for expanding the cattle value chain and for territorial housing policies.

IMPACT

What evidence is there from the ROAs of MapBiomas driving Impact?
→ There is evidence across the board that the strategic application of MapBiomas products by decision-makers is done with the aim of improving the sustainable management of natural resources. For many biomes, MapBiomas is the most reliable source of information for such decision-makers and the tool has made evidence-based information much more readily available and accessible. In other words, the existence of MapBiomas has accelerated a move towards the desired positive impact on land-use and climate change mitigation.

→ Many users suggested that, without MapBiomas, they would have faced difficulties in trying to achieve the same results within the same timeframe or at all. MapBiomas has been mentioned as a time saver and more efficient analysis tool.

→ One less obvious contribution of MapBiomas towards impact is that many stakeholders felt more “positive” pressure to act and more reasons to do so once MapBiomas increased awareness on land-use issues. The possible inclusion of “other wooded lands” in the EU deforestation regulation or the recent use of MapBiomas Alert by banks in order to check illegal deforestation of loanees are examples of such change in behaviour due to the existence of MapBiomas in the Brazilian land-use ecosystem. 8 of the 10 biggest banks in Brazil rely on Mapbiomas; the 3 largest meatpackers and the two largest paper companies also access the platform to inform decisions.

2.1.6
MAPBIOMAS
VALUE ADD

Workshop participants pointed to a number of significant changes to the way land-use and cover information is accessed and used, since the creation of MapBiomas

The 52 participants of the eight Rapid Outcome Assessment workshops were asked to reflect on land-use management and tools in Brazil before and after the founding of MapBiomas.

The findings from these workshops shine a light on the perceived value added of MapBiomas and its potential for impact.

BEFORE

A WORLD WITHOUT MAPBIOMAS

BEFORE MAPBIOMAS, PARTICIPANTS REPORTED THE FOLLOWING:

→ **Data availability was highly restricted,** including a lack of general information on land-use and cover, no platforms with multiple layers, very little possibility of data integration and most data was slow to be updated.

→ **Previously the unique focus was on the Amazon and on Deforestation,** with no country-wide data available that covered all of Brazil's six biomes.

→ **Information was the domain of specialists,** with no direct access to maps or data for non-specialists, such as the media, business or finance institutions.

AFTER

MAPBIOMAS VALUE ADD

THE ARRIVAL ON THE SCENE OF MAPBIOMAS FROM 2015 onwards meant a significant shift in access, use and application of land-use and land cover information in Brazil:

→ **MapBiomas fills a data gap** that governmental bodies were not able to provide, given their more limited scope and resources.

→ **Informed public debate on land-use and environmental issues is now possible,** given the new data and communication materials that was made readily available by MapBiomas and its partners.

→ MapBiomas demonstrates that it is possible to **provide maps on land-use and land cover for the whole country along with a historical series,** for the first time. This has served as inspiration for other tools and platforms in Brazil and beyond.

→ The platform provides, for the first time, a **macro vision of Brazil, its biomes and the relationships between them.** It also allows for bioregional views, for example of river basins.

→ The national and international **media now discusses biomes other than the Amazon, and explores issues** that go beyond deforestation, as well as the relationship between deforestation and other critical themes.

→ **Governmental bodies have themselves innovated in their use of technology,** as a result of the technology development promoted by MapBiomas.

→ By gathering data from different sources, MapBiomas – and in particular Alerts – **supports monitoring and surveillance bodies in fighting environmental crimes and had changed the perception of surveillance efficiency, including by offenders.**

→ For those private sector companies and financial institutions that do not have their own monitoring technology, MapBiomas offers an **open, free and public platform for land-use monitoring and risk management.**

2.2

IMPACT CASE STUDIES

2.2

2.2.1 – SUMMARY OF CASES

Six case studies

illustrate how the strategic application of MapBiomas products leads to impact on sustainable natural resource management

Public Prosecutor's Office and the Judiciary

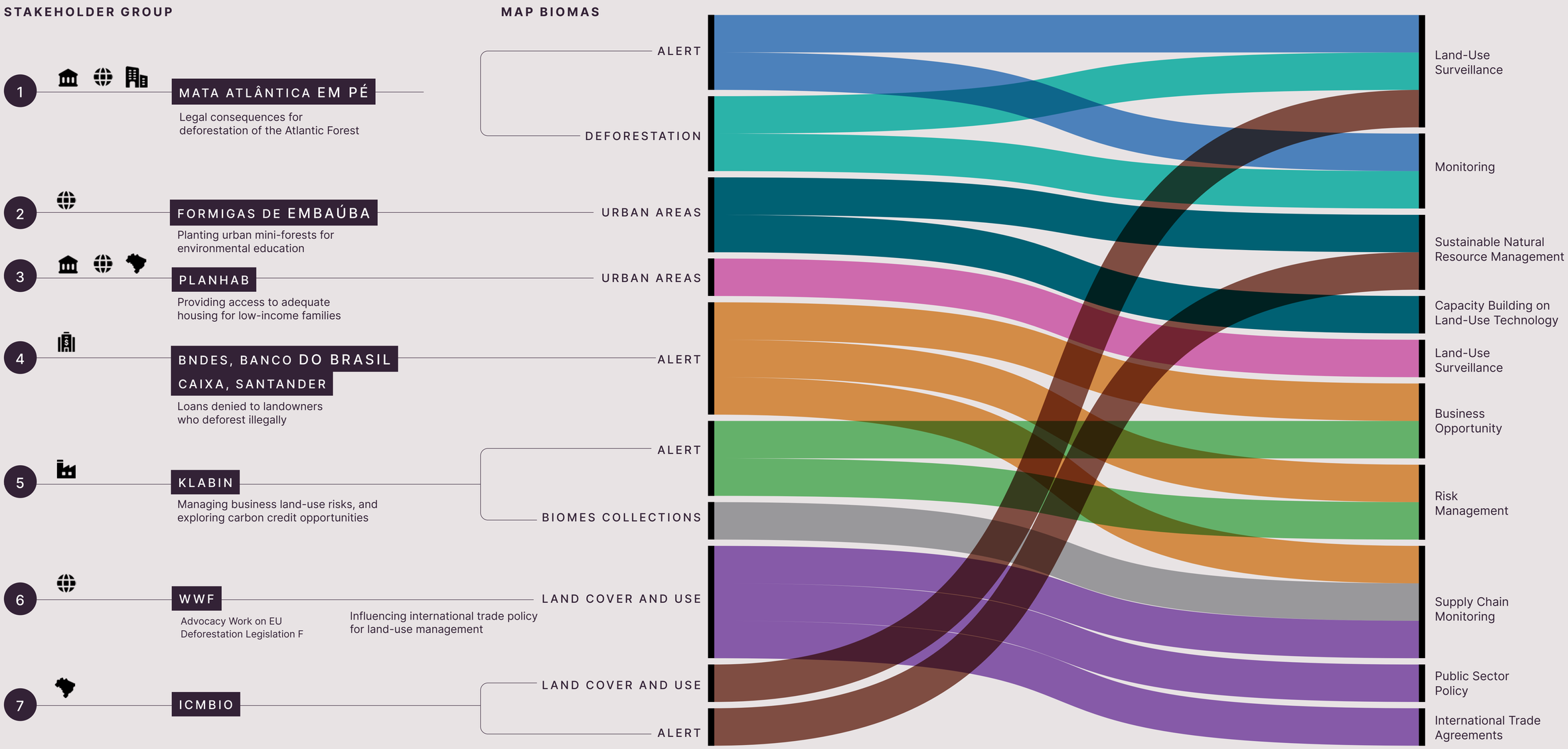
State Government

NGO and international organization

Federal Government

Finance institution

Business & Industry



Mata Atlântica em Pé: civil society, public prosecutor and state government working together to tackle deforestation

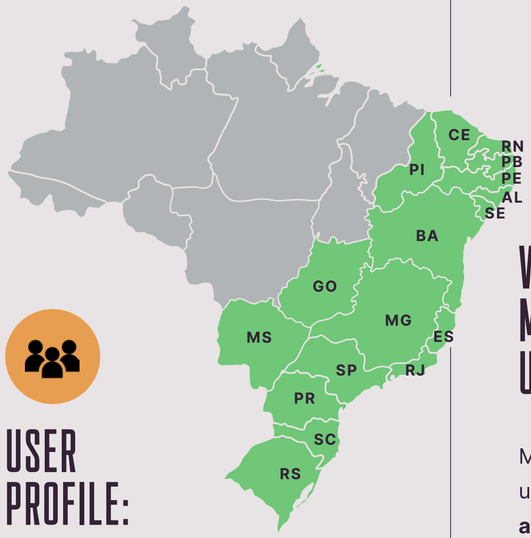
1

HOW IS MAPBIOMAS USED?

MapBiomas Alert accessed with support from the NGO SOS Mata Atlântica to **identify deforested areas** Public Prosecution Offices and environmental surveillance bodies **identify landowners and licenses** (crosschecked with governmental Sinaflor platform)

The Public Prosecutor's Office's environmental police conduct **on the ground or remote surveillance** (with support from MapBiomas historic data) for areas with **illegality risks**

Based on evidence from the surveillance operations, Public Prosecutor's Offices **take judicial and non-judicial (embargoes, fines) measures** to punish offenders and repair damage. This model is also used in Brazil in other similar actions, such as the 'Projeto Amazônia Protege'.



USER PROFILE:

The operation involves

17

Brazilian states, their Public Prosecutor's Offices, and the environmental police, working in partnership on an annual basis by means of an integrated taskforce

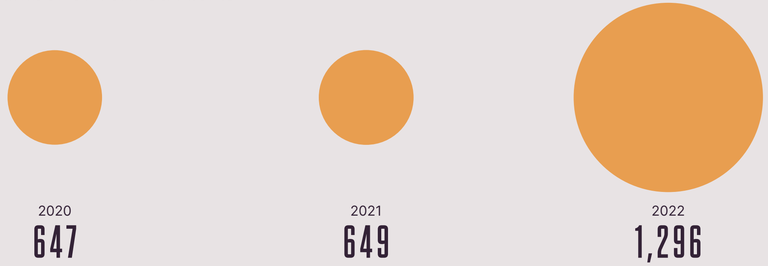
WHY IS MAPBIOMAS USED?

MapBiomas Alert is used **as a reliable, accessible source for identifying deforested areas and monitoring historic vegetation cover**, enabling agile responses to deforestation on an annual basis. The operations are widely covered in local and national media in Brazil

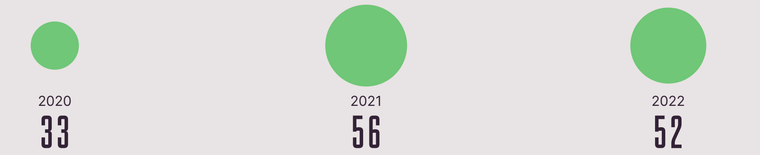
RESULTS

Total hectares surveyed (1000s)

Number of verified Alerts



Fines (R$ millions)



2.2.2 – CASE 2. PLANTING URBAN MINI-FORESTS FOR ENVIRONMENTAL EDUCATION

In urban areas of Sao Paulo, MapBiomas has helped to identify state lands on which to promote reforestation and environmental education in schools

2

FORMIGAS DE EMBAÚBA

URBAN AREAS

Sustainable Natural Resource Management

Capacity Building on Land-Use Technology

HOW IS MAPBIOMAS USED?

In 2022 ‘Formigas de Embaúba’ contacted MapBiomas in order to **identify priority areas in which to work in the city of São Paulo**. The Urban Areas team from MapBiomas used satellite imagery to identify areas where the project could plant trees, **and cross-referenced this information** with data from the Mayor’s office regarding school locations, and existing forest remnants. With these data sets, **an application was developed** for the organization:

the app allows users to see the areas highlighted by the NGO, to pre-select areas and schools and to gather progress data on project implementation.

USER PROFILE:

‘Formigas de Embaúba’ is an NGO based in the city of São Paulo that **plants ‘mini-forests’ in public schools using native species from the Atlantic Forest.** The process involves **training teachers** and working with students in **environmental education initiatives**.

WHY IS MAPBIOMAS USED?

The main difficulty that the NGO faced was in accessing **data that could support the identification of priority areas to plant the mini-forests.** These data sets were made readily available by the Urban Areas team at MapBiomas and could easily be transposed to the app and updated in real time.

RESULTS

7 ‘mini-forests’ planted with

7,000 trees and

104 native species

700
PUBLIC-SECTOR TEACHERS participated in capacity building

1,500+
STUDENTS from low-income neighbourhoods participated in the 6 outdoor courses

The mini-forests will be used as **outdoor classrooms** for environmental education and **connecting with nature.**

MapBiomas data is coupled with government statistics to improve implementation of the National Housing Plan

3

PLANHAB

URBAN AREAS — Land-Use Surveillance

HOW IS MAPBIOMAS USED?

MapBiomas provided to PlanHab **annual data on urban occupation in Brazil** and cross-referenced urban areas with those areas that were classified by the Brazilian Statistics Institute (IBGE) to be sub-normal urban clusters.

The intelligence made it possible to map urban occupations, population density and areas of high and low growth.

USER PROFILE:

PlanHab is a Brazilian government program aimed at **promoting access to adequate housing for low-income families** in the country. It is implemented by the **Ministry of Cities**, in partnership with state and municipal governments and civil society organizations, and offers subsidies, financing, and technical assistance to help families acquire or improve their homes.

WHY IS MAPBIOMAS USED?

PlanHab needs access to land-use data to implement national legislation on social housing, infrastructure and land tenure. **MapBiomas fills a gap in the official Census data** by providing a more refined perspective on recent urban development. Specifically, the MapBiomas data made it **possible to analyse population and residential changes in the most vulnerable urban communities** and those areas defined as high-risk by the IBGE. The cross-referencing of information with MapBiomas meant **data that could not be accessed through official means was made available for the first time**.

RESULTS

IMPROVED TARGETING OF INTERVENTIONS:

By identifying areas of environmental risk, PlanHab has been able to prioritize interventions in areas where they are most needed, improving the effectiveness of the program.

BETTER UNDERSTANDING OF LAND-USE DYNAMICS:

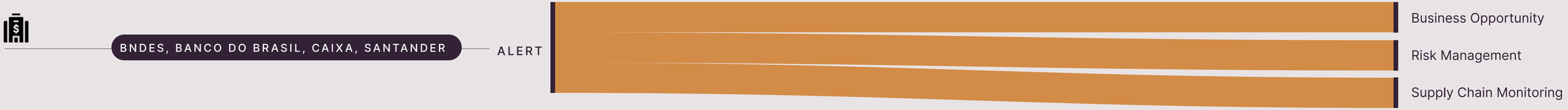
PlanHab has gained a better understanding of land-use dynamics in the areas where the program is implemented, and would not have been able to do so by means of IBGE data.

IMPROVED DECISION-MAKING:

MapBiomas data has provided PlanHab with the information it needs to make informed decisions about where to allocate resources and how to design interventions, improving the efficiency of the program.

Finance institutions use MapBiomas Alert to inform decisions on rural loans, denying credit to farmers who have deforested illegally

4



HOW IS MAPBIOMAS USED?

The banks use MapBiomas Alert, to make decisions on granting rural loans to farmers, by **blocking those properties on which illegal deforestation has been identified**.

MapBiomas is also utilized for social and **environmental risk analyses for rural properties that are used as collateral** for loans. The BNDES system for example now has an **automated integration with MapBiomas data** to identify at risk properties.

For Santander, if evidence is found on a client's property of deforestation, and the client is subsequently unable to provide proof of the relevant legal authorization to deforest, the bank requires the loan to be reimbursed.

USER PROFILE:

The Brazilian National Development Bank, BNDES, along with Banco do Brasil and Caixa Econômica Federal are the leading lenders for rural credit, and all have signed Cooperation Agreements with MapBiomas.

WHY IS MAPBIOMAS USED?

The use of MapBiomas by Brazil's leading finance institutions provides evidence of **the tool's strategic application in risk management** and supply chain monitoring: banks in Brazil are required by law to comply with environmental regulations when granting credit, and **MapBiomas Alert provides accurate, timely information** on loanees that are high-risk or non-compliant.

RESULTS

Since signing the Cooperation Agreement with MapBiomas in February 2023, **BNDES** has denied requests for credit to 58 applicants, totalling

R$ 24.8M

across 14 states and covering

948 HEC.

of farmland.

BANCO DO BRASIL is responsible for 50% of all rural credit in Brazil, with a portfolio of

R$ 200BN

for credit as part of the Plano Safra for 2022/23. Banco do Brasil uses MapBiomas to check all requests for rural credit, and has denied more than 11,000 requests.

SANTANDER bank currently monitors more than

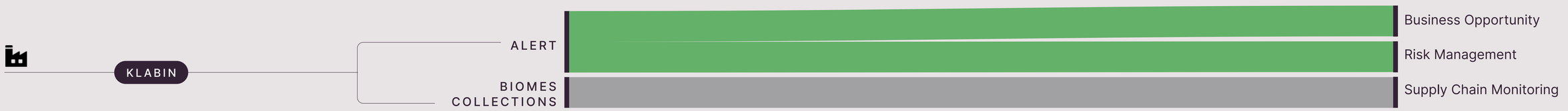
16,000

rural properties that are offered as loan guarantees and have been monitoring every MapBiomas Alert since March 2022.

Land based businesses have a lot of unexplored potential uses for MapBiomas diverse dataset, as Klabin exemplifies

5

Klabin



HOW IS MAPBIOMAS USED?

Teams from Klabin SA use land-use data from MapBiomas Alert, cross-referenced with other sources to provide information to Power BI, a business analytics service, with the following aims:

To ensure that the **company does not pass 25% forest cover** in any municipality with pine or eucalyptus.

To check that lease areas **comply with Forest Stewardship Council certification**, for example compliance with the requirement to have no-conversion after 1994.

The historic series of land coverage and use provides senior management at Klabin with executive reports for **eligibility studies for carbon credits**.

USER PROFILE:

Klabin SA is a **Brazilian pulp and paper company** that is one of the world's largest producers and exporters of pulp and paper. It is a major planter of non-native forests and is required to **manage a variety of direct and indirect environmental and social risks**.

WHY IS MAPBIOMAS USED?

The cross-referencing of data enables the company to **manage its own risks and portfolio**, as well as to monitor partner properties on leased land and other properties of interest, providing both **business opportunities, via carbon credits, and risk management**. MapBiomas Alert enables Klabin to **respond rapidly to any irregularities** identified in the properties within its portfolio.

RESULTS

Klabin's legal and environmental departments **regularly check hundreds of properties** that have not met with the required environmental or social criteria for partnering with the company. Other results include **Forest Code compliance**, and identification of **priority areas for planting and restoration**.

International regulation on imported deforestation is influenced directly by the use of MapBiomas data for advocacy

6

WWF

WWF

Advocacy Work on EU
Deforestation Legislation F

LAND COVER AND USE

HOW IS MAPBIOMAS USED?

In August 2021, WWF **published the Technical Note** 'Potential impacts of due diligence criteria on the protection of threatened South American non-forest natural ecosystems' to demonstrate that the EU's definition of forests did not cover those ecosystems that are most affected by deforestation in Latin America.

Under the EU's definition, it was believed, based on out-of-date data from IBGE, that some 80% of the Cerrado biome would be covered by the new legislation.

The Technical Note used MapBiomas data to effectively demonstrate that under that definition some two-thirds of the Cerrado biome would not be covered.

USER PROFILE:

WWF is one of the world's largest NGOs, with some 6,500 staff and presence in more than 100 countries. It regularly works in partnership with other NGOs and academia to influence national and international policies on land-use and biodiversity loss.

WHY IS MAPBIOMAS USED?

MapBiomas was recognized as a **reliable and accurate source of data on forest cover for the Cerrado, Caatinga, Pampa, Chaco and Amazon**, providing quantitative data that contested the assumptions about coverage under the proposed new legislation.

RESULTS

Although the 'non-wooded lands' were not included in the current version of the legislation, the use of MapBiomas to support the Technical Note had a number of important repercussions:

The development of the Technical Note **brought together a number of key NGO partners, part of the 'Rede Cerrado'**, to engage directly with the proposed EU legislation;

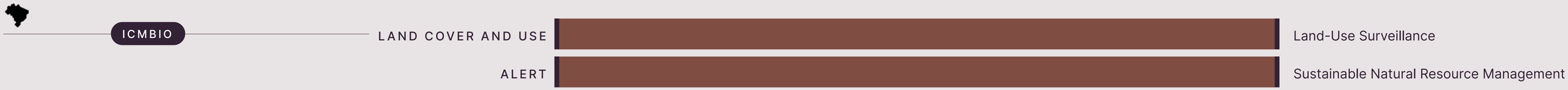
It became possible to **negotiate other elements of the legislation**, including traceability to the farm;

The **EU agreed to review the inclusion of non-wooded lands** after one year and is now carrying out an impact study.

The ‘Instituto Chico Mendes de Conservação da Biodiversidade’ (ICMBio) is responsible for managing Conservation Units in the Amazon, which face illegal deforestation within their borders

7

With historical data from MapBiomas Land-use & Cover and MapBiomas Alerts, the Institute has been able to act in remote areas that are difficult to access



HOW IS MAPBIOMAS USED?

With remote sensoring data provided by MapBiomas on historical land-use and cover, the Institute is able to identify areas that have been deforested after the creation of the Conservation Units; by law, any deforestation in these areas is illegal and should be embargoed. Mapping these illegal areas is the first step to embargo, which can lead to sanctions placed on criminals, as part of actions conducted by ICMBio together with State Prosecutors.

MapBiomas also provided specific technical documents connecting its maps to other national sources of data to identify the people responsible and MapBiomas Alert supports further identification of more recent activities.

USER PROFILE:

ICMBio is responsible for protecting natural resources in Federal Conservation Units which cover more than 9.4% of Brazil. Part of its job is to control illegal economic activities inside these areas, which suffer extreme pressures, particularly in the Amazon. In the State of Pará, many of these pressures relate to cattle ranching.

WHY IS MAPBIOMAS USED?

Conservation Units in the Amazon are difficult to access and cover immense areas, which make them hard to monitor and control by ICMBio. The Institute also is short-staffed and on-site operations are sometimes risky. With MapBiomas data, the process of identification, embargo and prosecution can be conducted remotely.

RESULTS

Since 2020, the pilot project on the REBIO Cachimbo Biological Reserve (chosen because of its conservation relevance and high rates of deforestation) was expanded to 10 other Conservation Units in Pará, which, together represent 15% of the total area protected by Conservation Units and 50% of deforestation inside Conservation Units in Brazil (2021).

TOTAL NUMBER OF EMBARGOES:

553

TOTAL AREA EMBARGOED:

102,265 HECTARES

TOTAL VALUE OF FINES:

R$ 485 MILLION

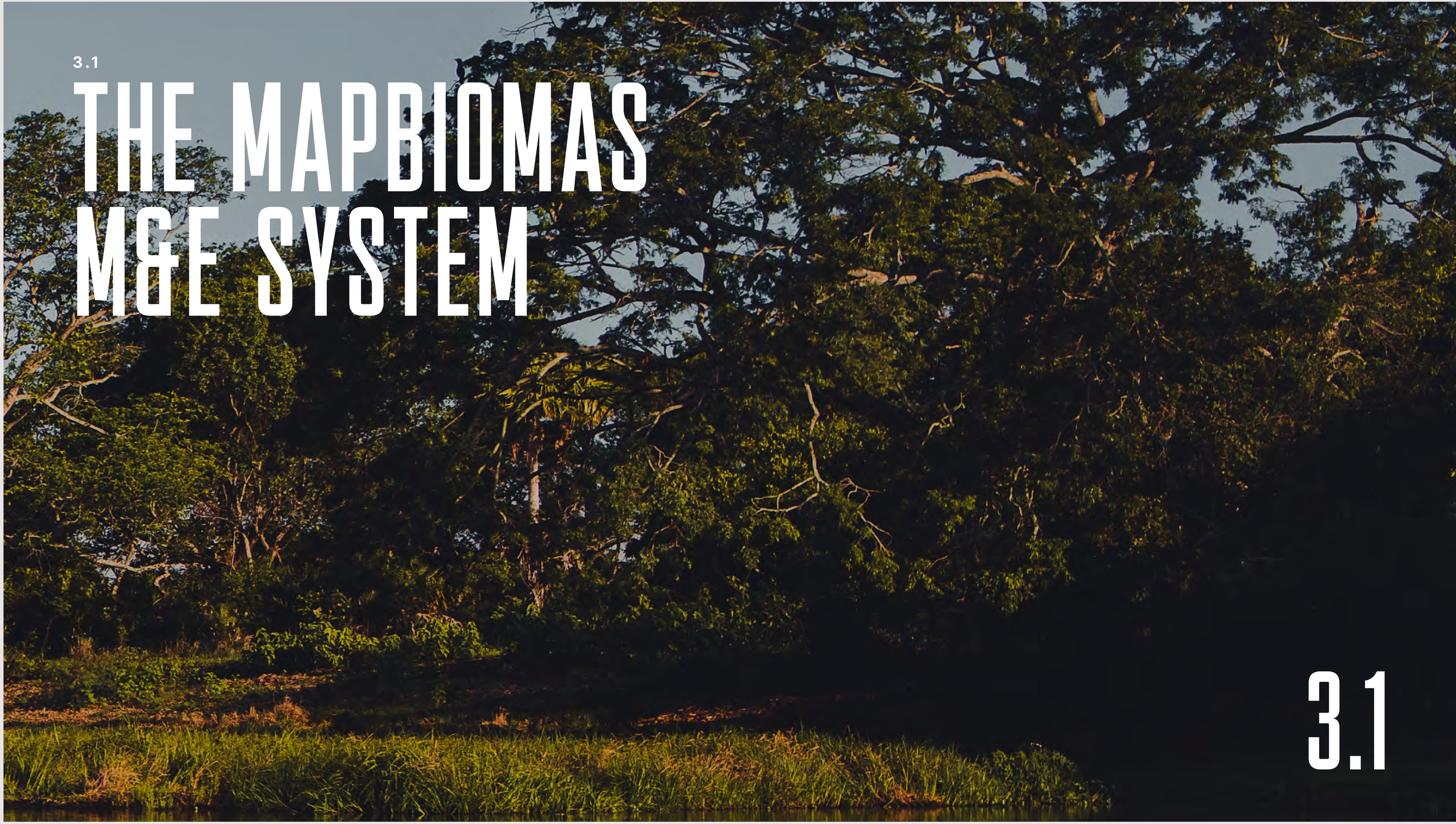
3

MONITORING & EVALUATION SYSTEM

Photo: Nathalia Segato / Unsplash

3.1

THE MAPBIOMAS M&E SYSTEM



3.1

3.1.1 – ELEMENTS OF AN EFFECTIVE M&E SYSTEM

What does a good M&E System for MapBiomas look like?

WHY DOES MAPBIOMAS NEED AN M&E SYSTEM?

→ An effective M&E System provides **accountability** and **legitimacy** for collaborators, partners and funders

→ There is a growing number of different teams and initiatives within MapBiomas: **a simple, unified M&E System will bring everyone onto the same page**

→ Indicators, when used effectively, can indicate the **extent to which the MapBiomas strategy is being effectively implemented**, and can enable **course corrections on strategy**

→ In the context of international expansion, the Brazil system of M&E can serve as **a reference for subsequent adoption and adaptation**

WHAT ARE THE KEY ELEMENTS OF AN EFFECTIVE M&E SYSTEM?

→ It needs to be **sufficiently robust to be valid**, while also being **simple enough to be implemented**

→ As **integrated** to other activities as possible (communications, regular meetings, etc)

→ **Involve the right people**: clarity of roles and responsibilities

→ At the same time, incentivize a move towards **a culture of M&E** across the organization

→ A system that covers both **operational and strategic issues**, **quantitative data and qualitative story-telling**

KEY RESOURCES AND REQUIREMENTS

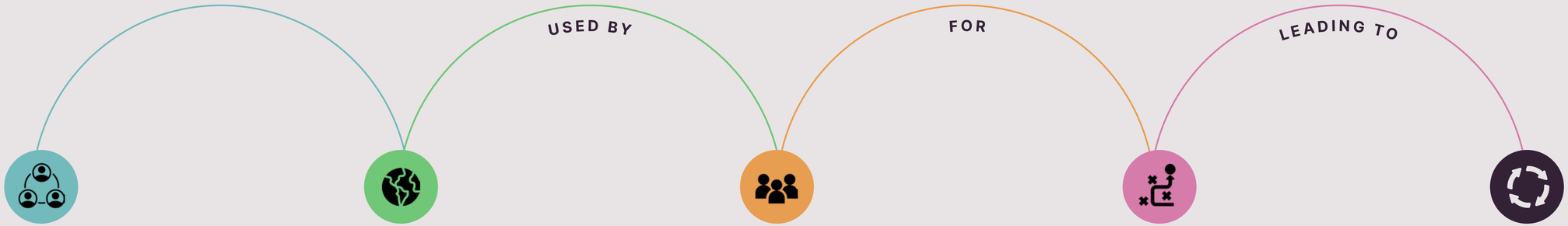
→ **Strategic alignment of the Executive Committee**

→ **Internal review and ownership** of strategic applications, desired impact and outcomes

→ **Data on selected indicators** – some tools are suggested to support an impact narrative focus

→ **A champion – hiring an M&E specialist is recommended**

3.1.2 – TYPES OF INDICATORS Indicators will be established across four key areas: outputs, outcomes, impact and community; they will be complemented by impact case studies



1. COMMUNITY INDICATORS

→ Provide an indication of the extent to which a community of practice around MapBiomas is being consolidated

2. OUTPUT INDICATORS

→ Measure quantifiable outputs over which the MapBiomas Collaborator Community has direct or indirect control

3. OUTCOME INDICATORS

→ Demonstrate the extent to which decision-makers are using MapBiomas products to support their strategic decisions

4. IMPACT INDICATORS

→ Indicate the extent to which advances are being made on achieving MapBiomas' purpose, even when other contributing factors are involved

LEVEL OF MAPBIOMAS INFLUENCE

HIGH — PARTIAL — MARGINAL

IMPACT CASE STUDIES

→ Use the power of narratives to demonstrate the transformative ways in which MapBiomas is used and applied by different stakeholders

A few key indicators for each area of analysis are proposed

1. COMMUNITY INDICATORS

1. Number of users for each one of the main stakeholder groups

2. Number of technical agreements active in the calendar year (per stakeholder group)

3. Number of individuals who have participated in a capacity building training in the calendar year

4. Percentage of collaborators who understand well how MapBiomas works (thermometer)

5. Percentage of collaborators who rank high or very high in decision to recommend MapBiomas as a place to work (thermometer)

6. Percentage of collaborators who rank high or very high in their sense of feeling part of the network (thermometer)

2. OUTPUT INDICATORS

1. Accuracy of MapBiomas data

2. Number of customizing users of MapBiomas Alert

3. Number of factsheet style publications per semester (by product)

4. Time for resolution for support ticket

5. Level of satisfaction of users with the resolution of support ticket

6. Quantity of engagements (by social media)

7. Quantity of citations In peer-reviewed academic journals

3. OUTCOME INDICATORS

Percentage of the x key stakeholders in each group that use MapBiomas to make strategic decisions [see subsequent pages for explanation]

1. Federal Government

2. State Government

3. Public Prosecutor's Office and the Judiciary

4. Business and Industry

5. Finance Institutions

6. NGOs and International Organizations

7. Academia

4. IMPACT INDICATORS

1. Deforestation area increase/ decrease on previous year (by biome)

2. Percentage of rural properties on which deforestation took place in the previous calendar year

3. Percentage of total area with illegal deforestation embargoed

4. Percentage of (state-level) action on deforestation (by state)

5. Percentage of pasture with no degradation

6. Ratio of area of pasture being recovered and area of pasture being degraded

7. Evolution of GHG emissions from land-use, land-use change and forest in Brazil

3.1.4 – M&E TOOLS For implementation of the M&E system, a set of seven tools is proposed (see chapter 3.3 for additional information)

	TOOL	DESCRIPTION	RESPONSIBILITY
	**User Form** 🟢	→ A voluntary on-line pop-up form for users, to track user strategic application	→ Technical Coordination
	**Executive Committee Progress Review** 🟠	→ Physical Meeting of the Executive Committee with review of all four indicator groups, strategic review and course correction	→ Executive Committee Data gathering coordinated by the M&E Specialist
	**User Impact Survey** 🔵	→ E-mail to users to analyse of use, strategic application and impact of users	→ M&E Specialist
	**Team thermometer Survey** 🔵	→ Annual survey (in format of on-line form) sent to all collaborators to assess community progress and indicators	→ M&E Specialist
	**Annual Report** 🔵	→ External facing annual report to funders and the MapBiomas community, publishing output, outcome, impact and community indictors, along with at least six impact case studies	→ Communications Coordination Data gathering coordinated by the M&E Specialist
	**Strategic Planning** 🔵	→ Physical Meeting of the Executive Committee to review governance, decision-making, progress and impact; and revision of three-year revolving strategic plan	→ General Coordination
	**External Evaluation** 🩷	→ An external review of progress and impact by an independent third-party specialists	→ General Coordination to hire the consultancy

🟢 CONTINUOUS 🔵 ANNUAL 🟠 BIANNUAL 🩷 EVERY 3 YEARS

3.2

INDICATORS AND BASELINE

3.2

3.2.1 – COMMUNITY INDICATORS Community indicators assess the strength of the MapBiomas network and capacity building

	INDICATOR	MEANS OF VERIFICATION	2023 BASELINE VALUE	AREA RESPONSIBLE
COMMUNITY INDICATORS 1	**Number of users for each one of the main stakeholder groups** ●	User form, with clearly defined options for stakeholder group	Unavailable	Communication Coordination
	Number of technical agreements active in the calendar year (per stakeholder group) ●	Technical Cooperation Agreement control	17	Institutional Articulation
	Number of individuals who have participated in a capacity building training in the calendar year ●	Organized training and capacity bulding team, with forms for registration and control	Unavailable – only some trainings had registrations	Training area (proposed)
	Percentage of collaborators who understand well how MapBiomas works ●	Internal thermometer	95%	Project Manager
	Percentage of collaborators who rank high or very high in decision to recommend MapBiomas as a place to work ●	Internal thermometer	87.5%	Project Manager
	Percentage of collaborators who rank high or very high their sense of feeling part of the network ●	Internal thermometer	85%	Project Manager

● CONTINUOUS ● ANNUAL ● BIANNUAL ● EVERY 3 YEARS

3.2.2 – OUTPUT INDICATORS **Output indicators measure factors that are directly within the control of the MapBiomas teams**

	INDICATOR	MEANS OF VERIFICATION	2023 BASELINE VALUE	AREA RESPONSIBLE
2 OUTPUT INDICATORS	**Accuracy of MapBiomas data from most recent Collection** 🔵🟢	Should follow most adequate scientific methodology, for all products and collections. Measured by general accuracy, global, level 1. **Should be developed and made available for all products**	91.5%	Technical Coordination
	Number of customizing users of MapBiomas Alert 🔵	Automated information	82	Institutional Articulation
	Number of factsheet style publications per semester (by product) 🟠	Control from the communication team according to comm plan	Unavailable	Communication Coordination
	Time for resolution for support ticket 🟠	Currently, time for answer in the Forum until final resolution. Ideally, over all requests in an accountable process	Unavailable	Scientific Coordination
	Level of satisfaction of users with the resolution of support ticket 🟠	User impact Survey	Unavailable	Scientific Coordination
	Quantity of engagements (by social media) 🟠	By each social media account (more sophisticated indicators are possible, depending on MapBiomas maturity level, such as content shared or conversion of users)	Twitter: 9.327 Facebook: 6.240 Linkedin: 14.747 Instagram: 23.786 Youtbe: 9.852	Communication Coordination
	Quantity of citations In peer-reviewed academic journals 🔵	Weekly review conducted by the Scientific Coordination	681	Project Manager

🟢 EVERY NEW UPDATE 🔵 ANNUAL 🟠 BIANNUAL 🟣 EVERY 3 YEARS

3.2.3 – OUTCOME INDICATORS Outcome indicators are related to the strategic application of MapBiomas products; their analysis requires engagement with stakeholders

	INDICATOR	MEANS OF VERIFICATION	2023 BASELINE VALUE	AREA RESPONSIBLE
OUTCOME INDICATORS 3	**Percentage of the x principal stakeholders in each group that use MapBiomas to make strategic decisions** ●	Institution articulation records → Ongoing technical cooperation agreements → Documented partnerships (including non-TCA) → Customized Alert user registration User survey (email)	-	Institutional articulation Scientific Coordination
	Federal Government	Technical Cooperation Agreement (TCA)	10	
	State Government	TCA	6	
	Public Prosecutor's Office and the Judiciary	Customized Alert users	22	
	Business and Industry	TCA	4	
	Finance institutions	TCA	4 out to 10	
	NGOs and International Organizations	TCA	1	

● CONTINUOUS ● ANNUAL ● BIANNUAL ● EVERY 3 YEARS

3.2.4 – IMPACT INDICATORS Impact indicators show progress on long-term goals; while not attributable directly or solely to MapBiomas, they give a sense of the direction of travel

	INDICATOR	MEANS OF VERIFICATION	2023 BASELINE VALUE	AREA RESPONSIBLE
IMPACT INDICATORS	**Deforestation area increase/ decrease on previous year (% by biome, areas >5ha) Amazon, Atlantic Forest, Cerrado, Caatinga, Pampa, Pantanal** ●	RAD MapBiomas Report	-	Technical Coordination
	Percentage of rural properties on which deforestation took place in the previous calendar year ●	RAD MapBiomas Report	0.9%	Technical Coordination
	% of area with Alerts (ha) with embargos (incremental from begging of Alerts) ●	Surveillance monitor	5.2%	Technical Coordination
	Percentage of pasture with no degradation ●	MapBiomas Quality of Pasture	37%	Technical Coordination
	Percentage of (state-level) action on deforestation (by state) ●	Surveillance Monitor	20.4% (national)	Technical Coordination
	Annual rate of increase of concentration of greenhouse gasses (GHGs) in the atmosphere ●	SEEG	+12.2%	Technical Coordination

4

● CONTINUOUS ● ANNUAL ● BIANNUAL ● EVERY 3 YEARS

3.3

M&E TOOLS

3.3

3.3.1 – USER FORM

A simple and voluntary user form, collecting information focused on final use could support a better understanding of the MapBiomas user base

Voluntary Online User Form

Resp: Technical Coordination

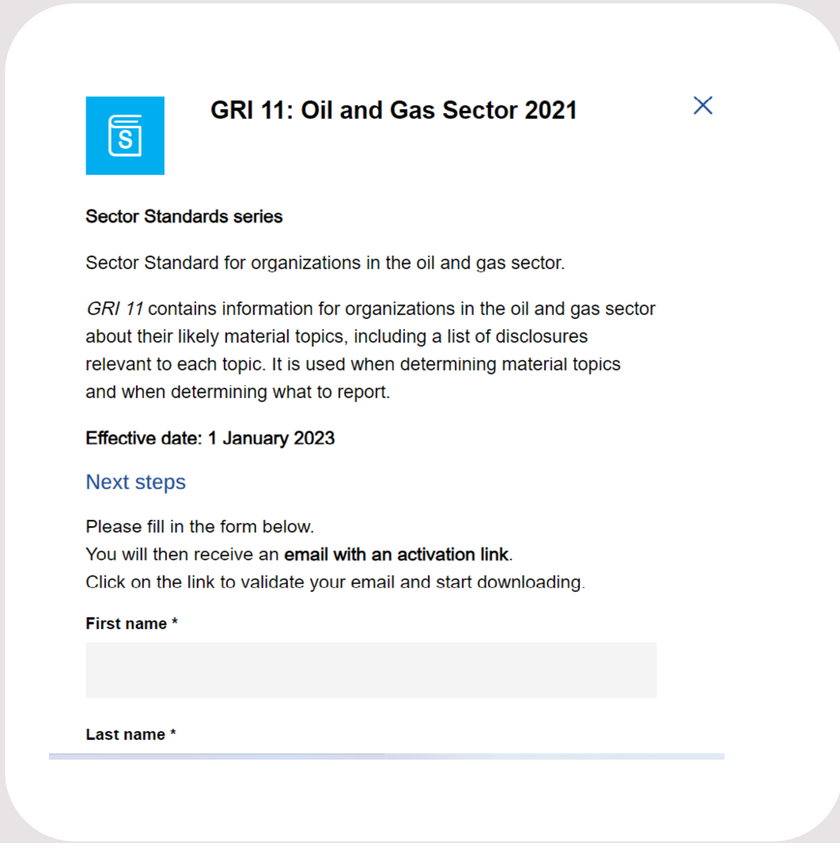
Frequency:

● CONTINUOUS

MapBiomas has a wide variety of users, growing steadily since its launch, although the profile of this user base is not fully understood: the website currently has no mechanism to allow users to submit information on their profile or interest in the platform. The website does offer a Forum for users, which is currently of little access compared to MapBiomas reach (around 2 comments/month).

A simple, voluntary user form, that is compliant with Brazilian Data Protection Law, could be posited to users before they download material, in order to gather better data on the user base.

Suggested Questions for Users: Area of work, recurrency of use, strategic application, examples of end results or cases [open field], user feedback and comments.



Example: GRI user form for download

3.3.2 – PROGRESS REVIEW

A review, twice a year, of the indicators set out here will provide the Executive Committee an opportunity to review strategy and course correct

6 MONTHS

Executive Committee Progress Review

Resp: Executive Committee
Data gathering coordinated by the M&E Specialist

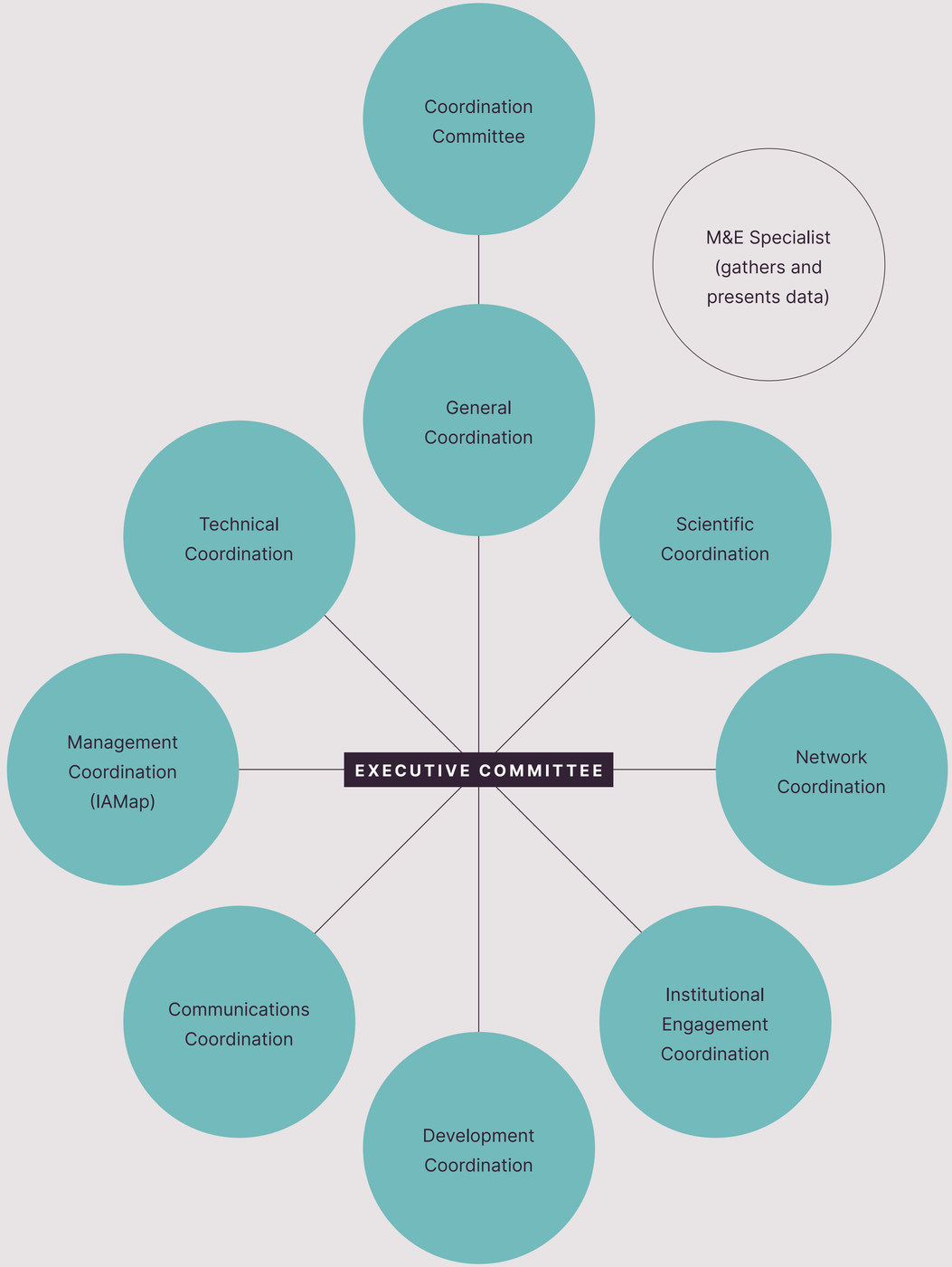
Frequency:

● **BIANNUAL**

The biannual progress review would ideally be a physical meeting of the Executive Committee involving a review of all four indicator groups, along with a review of strategy and course correction.

The review can be coordinated by the M&E Specialist, to ensure that all the relevant indicators are gathered in a timely manner and presented in advance to the Executive Committee.

Making this an in-person meeting is important if a culture of monitoring and evaluation is to be inculcated.



The Team thermometer Survey and User Impact Survey can provide annual inputs on the MapBiomas community of collaborators and users

ANNUALLY (1/2)

Team thermometer Survey

Resp: M&E Specialist

Frequency:

ANNUAL

The internal thermometer developed by Olab should be run annually to assess how MapBiomas is perceived by its collaborators and inform decisions for the next strategic planning cycle. Questions cover issues including sense of integration, job satisfaction, connection with MapBiomas purpose and understanding of the network. The Survey has already been rolled out in March-April 2022, with 40 respondents.

User Impact Survey

Resp: M&E Specialist

Frequency:

ANNUAL

This tool is a simple form, sent to users by e-mail to gather information on their strategic application of MapBiomas products and their perceived impact relating to sustainable management of natural resources and climate change mitigation and adaptation. The form can also provide a dialogue channel between users and the Executive Committee, with free space for providing feedback and general comments.

Example: Trase email survey with users

Model for User Impact Survey

Introductory text

MapBiomas is a free access, open source data provider widely used for different purposes. As such, feedback from users is relevant to us.

By telling us how often and for what purpose you access MapBiomas, you are supporting our continuous development. This survey should take less than 5 minutes. Please answer by the _____.

You can also share this message with anyone you know that has used MapBiomas. If you have any questions, please write to us at: _____.

Questions

When did you last use MapBiomas?
- ○ This week
- ○ This month
- ○ Within the last 3 months
- ○ Last semester
- ○ Last year

How often to you use MapBiomas?
- ○ Weekly
- ○ Monthly
- ○ Annualy
- ○ Sporadically

In which group do you fit best:
- ○ Academia
- ○ Business and Industry
- ○ Federal Government
- ○ Finance Institution
- ○ NGO
- ○ Press/media
- ○ Public Prosecutor's Office or the Judiciary
- ○ State Government
- ○ Other (please add)

Which MapBiomas product do you access (choose as all that apply)
- ○ Land-use and cover maps
- ○ MapBiomas Alert
- ○ MapBiomas Deforestation
- ○ MapBiomas Fire
- ○ MapBiomas Pasture Quality
- ○ Mapbiomas Soil
- ○ MapBiomas Urban Areas
- ○ MapBiomas Water
- ○ Other (please add)

Which strategic purpose best describes your use?
- ○ Business opportunities and risk management
- ○ Capacity Building in land-use technology
- ○ Evidence based public debate
- ○ International agreements
- ○ Land-use planning
- ○ Land-use surveillance and monitoring
- ○ Public Sector Policy
- ○ Research
- ○ Supply chain monitoring
- ○ Sustainable natural resources management

How relevant is MapBiomas to your work:
- ○ Indispensable (wouldn´t be possible without it)
- ○ Necessary (would be able to do it, but with a lot more difficult or resources)
- ○ Complementary (adds important data to other tools)
- ○ Dispensable (easily substituted with other tools)

Has MapBiomas influenced... (choose all that apply):
- ○ Your knowledge?
- ○ Your individual practices at work?
- ○ The practices of your workplace?
- ○ Strategic decision-making in your workplace?
- ○ The relationship of your workplace with other stakeholders?
- ○ Final impacts on the ground?

Can you describe a relevant case of direct use (yours or your workplace) of MapBiomas, with its results and impacts (optional open question)

Do you have any recommendations for MapBiomas? (optional open question)

3.3.3 – ANNUAL M&E TOOLS

An annual cycle that includes face-to-face strategic planning and an Annual Report can also help to streamline reporting and course correct on strategy

Strategic Planning

Resp: M&E Specialist

Frequency:

ANNUAL

This can become an annual, in-person ritual, that provides an opportunity to celebrate the results from the previous year, and to bring together the Executive Committee to review governance, decision-making, progress and impact; and revision of three-year revolving strategic plan.

Annual Report

Resp: Communications Coordination

Frequency:

ANNUAL

Based on the key highlights of the year, the monthly narrative cases and other relevant news, MapBiomas should make an annual report available for all audiences, that could also support relationship with funders and other partners, current and potential.

The Annual Report is an external facing annual report to funders and the MapBiomas community, publishing output, outcome, impact and community indictors, along with at least six impact case studies. It can support relationships with funders and current and future partners; it could also offer a means of streamlining and simplifying donor reporting.

3.3.4 – EXTERNAL EVALUATION

An external evaluation every three years can support an institutional review of MapBiomas and a revision of indicators and impact

Strategic External Evaluation

Resp: General Coordination to hire the consultancy

Frequency:

EVERY 3 YEARS

An external evaluation allows for a deeper review, looking at MapBiomas documents, processes and results and engaging larger numbers of internal and external stakeholders. With an operating M&E System, the evaluation can be more effective.

As it was the case in this review, it can include a **Rapid Outcome Assessment**, along with **Impact Case Studies**, to understand how the platform is used, and to provide impact narratives.

Example: ROA workshop in 2023

INSTITUTIONAL EVALUATION

4

Photo: Nathalia Segato / Unsplash

4.1 SUMMARY OF FINDINGS

The assessment indicates that MapBiomas has been a critical player in providing land-use data to decision-makers on land-use; as it grows, tensions may become accentuated

FOUR KEY AREAS OF SUCCESS:

→ MapBiomas has played a significant role in making land cover information available to an increasingly diverse audience, in an approach that is both transparent and collaborative

→ Levels of collaborator commitment, connection and clarity are unprecedented; the tool is also widely admired by its users

→ The network model of governance is exceptional, and means a shared sense of ownership and empowerment

→ The profile of users has moved beyond the original community of academics and conservationists: the tool is now widely recognized and used by businesses, public sector organs and the media

SIX TENSIONS				WAYS FORWARD
→ The provision of accurate, scientific data serves as the basis of all MapBiomas' output. Accuracy is constantly improving and can improve further.	**ACCURACY**	VERSUS	**IMMEDIACY OF DATA** → MapBiomas is recognized for the timeliness of its data outputs, unlike some government data sets. This immediacy can sometimes come out the cost of greater accuracy.	→ Analysis shows that the accuracy of MapBiomas' maps and data continues to improve with each new Collection. The issue of accuracy may be more one of perception than reality – is better communication required around accuracy?
→ The perception of MapBiomas as a politically neutral data provider is key to the initiative's success.	**IMPARTIALITY**	VERSUS	**MISSION FOCUS** → MapBiomas' mission values sustainable land-use. A desire to accelerate change in this space could lead to confusion with advocacy.	→ The Executive Committee and Communications Coordination are responsible for ensuring that MapBiomas does not veer into a more overtly political space by advocating for specific positions or even overtly critical appraisal on land-use strategies and results.
→ MapBiomas' success is due, in part, to the vision, drive and mobilization skills of general coordinator, who continues to play a critical role in the initiative.	**GENERAL COORDINATOR**	VERSUS	**DEVOLVED DECISION-MAKING** → As the initiative grows further and wider, the need for devolved decision-making becomes more pressing, if it is to continue to be an agile operator.	→ Decision-making is still largely centred on the general coordinator, though some devolution has occurred through the General Coordination and Executive Committee. Clarity about what decisions are made at what levels could help to accelerate this shift.
→ MapBiomas has been able to grow fast and expand into new geographies thanks to its agile leadership and light structure.	**AGILE GROWTH**	VERSUS	**CONTROLLED STRATEGY** → The era of 'move fast and break things' is over for many start-ups and is not an approach that suits the MapBiomas mould. With more than 200 collaborators, alignment on strategy is key.	→ A strategic framework would support greater alignment amongst senior management, and provide an opportunity for annual course correction, based on a review of progress and impact indicators. This can be integrated with devolved decision-making and performance evaluation.
→ MapBiomas has achieved so much in a relatively short period of time due to the support of a multitude of donor organizations. External funding provides greater independence, agility and focus.	**DONOR FUNDING**	VERSUS	**SELF-FUNDING** → Independent funding schemes are themselves a means by which an organization can demonstrate its value.	→ Is now the time to develop a robust, multi-channel funding strategy, that would complement donor funding, and support more resilient and long-term solutions? It is advisable that MapBiomas develops a robust, multi-channel funding strategy, that would complement donor funding and support more resilient and long-term financial viability for the initiative.
→ In the Brazil context, the success of the MapBiomas model – in terms of governance, network and reach – has been proven. It empowers local organizations and people and promotes ownership.	**MODEL REPLICATION**	VERSUS	**TAILOR-MADE APPROACH** → MapBiomas is now operational in 13 countries, with this number likely to increase as new partnerships are established in Africa and beyond. A more tailored approach can itself lead to greater ownership and longevity.	→ Explore including non-local partners in contexts where this may make sense; develop a more tailored model for engaging specific user groups, understanding their needs and aspirations and building solutions to meet them.

4.2

CONTINUED SUCCESS OF THE MAPBIOMAS PRODUCT

4.2

FINDING

1

MapBiomas has played a significant role in making land-use and land-coverage data available to an increasingly diverse audience, in an approach that is both transparent and collaborative

4.2.1 — Quality, transparency, methodology

Mapbiomas has made **significant progress in generating and disseminating accurate information** on land-use and land cover in Brazil and beyond. Users who access MapBiomas' maps and databases give credit for the fact that MapBiomas tools, data and methodologies are all **open source**, allowing researchers and organizations to build on the MapBiomas approach, and to contribute to ongoing improvements and refinements.

At its core, MapBiomas is a **collaborative tool** that is constantly seeking to evolve and develop, in response to the needs, interests and expectations of the collaborators and partners who use it. An approach to development that involves **dialogue with experts is key to its success**. The **accuracy of information**, recognized to be more tenuous during the earlier Collections, has shown continuous improvement over time (from 89.1% in Collection 3.1 to 91.5% in the most recent one, Collection 7.1), although it is still questioned by some interlocutors. Here, the MapBiomas teams pointed to a **tension between investing in new products and investments in making incremental improvements in accuracy**, including with support to final users.

OPPORTUNITIES

→ **Ensure constant engagement with the best science and active dialogue with researchers and users**, including on MapBiomas' opportunities and limitations, in order to maintain the platform's respectability and position as the key reference on land-use and coverage. The Methodological Notes, Caution Notes and open scripts are essential for this relationship.

→ **Expand the availability of information on methodology and accuracy beyond the main Collection** to include other products.

→ As MapBiomas becomes a source for less technical audiences**, regularly publish an easy-to-understand explanation of each dataset and its limitations (what it is and is not)**.

FINDING

2

Levels of collaborator commitment, connection and clarity are unprecedented; the tool is also widely admired by its users

4.2.2 — Collaborator and User Appraisal

100%

of respondents report **alignment with MapBiomas' purpose**

95% understand how the MapBiomas network operates

88%

give a score of between 8 and 10 in answer to the question about the likelihood that they **would recommend MapBiomas as a place to work** (two-thirds give a score of 10)

All reported that working at MapBiomas is **a source of pride** for them

73%

describe the MapBiomas **workload as intense or very intense**

15%

of respondents reported that they did not feel fully integrated in the MapBiomas team

There was slightly less agreement that the internal management of MapBiomas has evolved to accompany the platform's growth, although 64% of respondents still gave a top mark for this indicator

OPPORTUNITIES

→ Amongst the Recommendations made by Collaborators who responded to the thermometer were:

→ **Share an overall vision** of products, network and new initiatives each year

→ **Greater operational structure and team**: increase the number of managers to take some of the workload from coordinators

→ **More decentralized decision-making**, involving teams in discussions around timelines for example

→ **Improve internal communication**, including the results of the Coordinators' meetings

→ Organize **more face-to-face events** to improve integration

FINDING

3

The approach to user engagement remains broad and could benefit from a more tailored approach to specific user groups

4.2.3 — Engagement and Comms

Since 2020, MapBiomas has successfully built closer relationships with a wider and more diverse audience beyond academia and NGOs. The development on the landing page of informative pieces (including factsheets, infographics and news) was a notable improvement in terms of content generation, and the **Institutional Engagement Team has been instrumental in advancing user relationships around MapBiomas Alert,** particularly among government and business & industry.

Other products, such as water, could benefit from a similarly targeted strategy.

MapBiomas has frequent users, those that are recurrent users and that have MapBiomas embedded in their workflow (academia, NGOs, Public Prosecutors, private sector); and light users and the media, which turn to MapBiomas for specific information at specific moments. **These audiences require different strategies for increased engagement**.

RECOMMENDATIONS

→ **Adopt a client-centric approach to engagement**, that involves understanding better each one of the main user groups, their perspectives, needs and expectations: see for example Peter Drucker's work on customer focus.

→ **Adopt and 'translate' content for use by the media.**

→ **To scale up use by business and industry, focus on sectorial initiatives and associations**, as well as in partnerships with dedicated system providers and consultancies, as the demand of private organizations might be more specific than the level of detail that MapBiomas provides by itself.

FINDING

4

There is a fine line between maintaining a neutral position as an information-driven platform, and fulfilling MapBiomas' objective of combating deforestation

4.2.4 — Impartiality

Many stakeholders, including collaborators and users, have voiced a growing concern with MapBiomas' most recent efforts to drive impact. One of MapBiomas strongest assets is its reputation as a scientifically based technical information provider, a hard-earned place in the ecosystem of environmental organizations. At the same time, the production of material via MapBiomas Alert, the Surveillance Monitor and, reports on deforestation can **veer into the political and advocacy space**.

There is no denying that MapBiomas' objective of curbing deforestation has a political edge to it: the choice of what to monitor and what to share is an overtly political choice. A 2022 report, published in partnership with IDS (Instituto Democracia e Sustentabilidade) that analysed the Federal Government's response to deforestation, described that response as 'insufficient'. **In its ambition to accelerate impact on land-use, is there a risk that MapBiomas may drift into action on advocacy, and thereby harm its image as an impartial player?**

There are two main risks with assuming a more vocal approach: the first is the **risk of losing legitimacy as an independent provider of information**; the second is that MapBiomas may end up **competing with those among its partner organizations that are specialized in advocacy**, running the risk of impacting their future relationships.

RECOMMENDATIONS

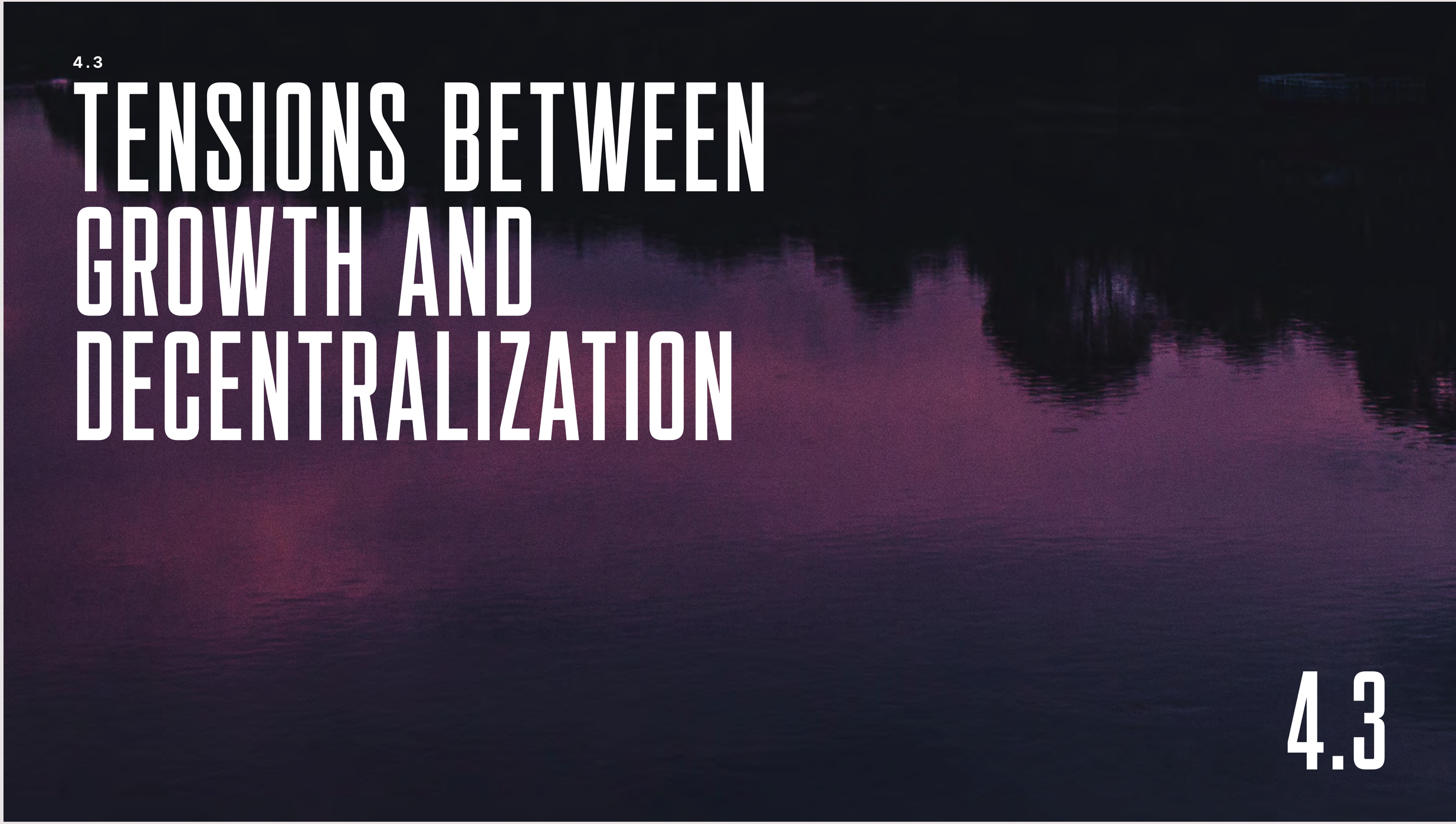
It is possible for MapBiomas to maintain a neutral, independent position while also achieving its mission on improving decision-making around sustainable natural resource management. Where MapBiomas can most add value is as follows:

→ **Inform advocacy partners where gaps and needs exist**, thereby allowing partner organizations to be more strategic in their approaches to leveraging change in both the public and private sectors, and ensuring that MapBiomas and their partners 'stay within their lanes'.

→ **Engage directly with specific stakeholder groups to build capacity and inform** them where and how MapBiomas tools could contribute towards better strategic outcomes. In the case of Brazilian banks that offer credit to rural landowners, for example, a number of banks do not use MapBiomas to determine credit worthiness. Without closing this loophole, those banks that do use MapBiomas run the risk of only shifting the problem of deforestation from their ledger to that of another bank.

4.3

TENSIONS BETWEEN GROWTH AND DECENTRALIZATION

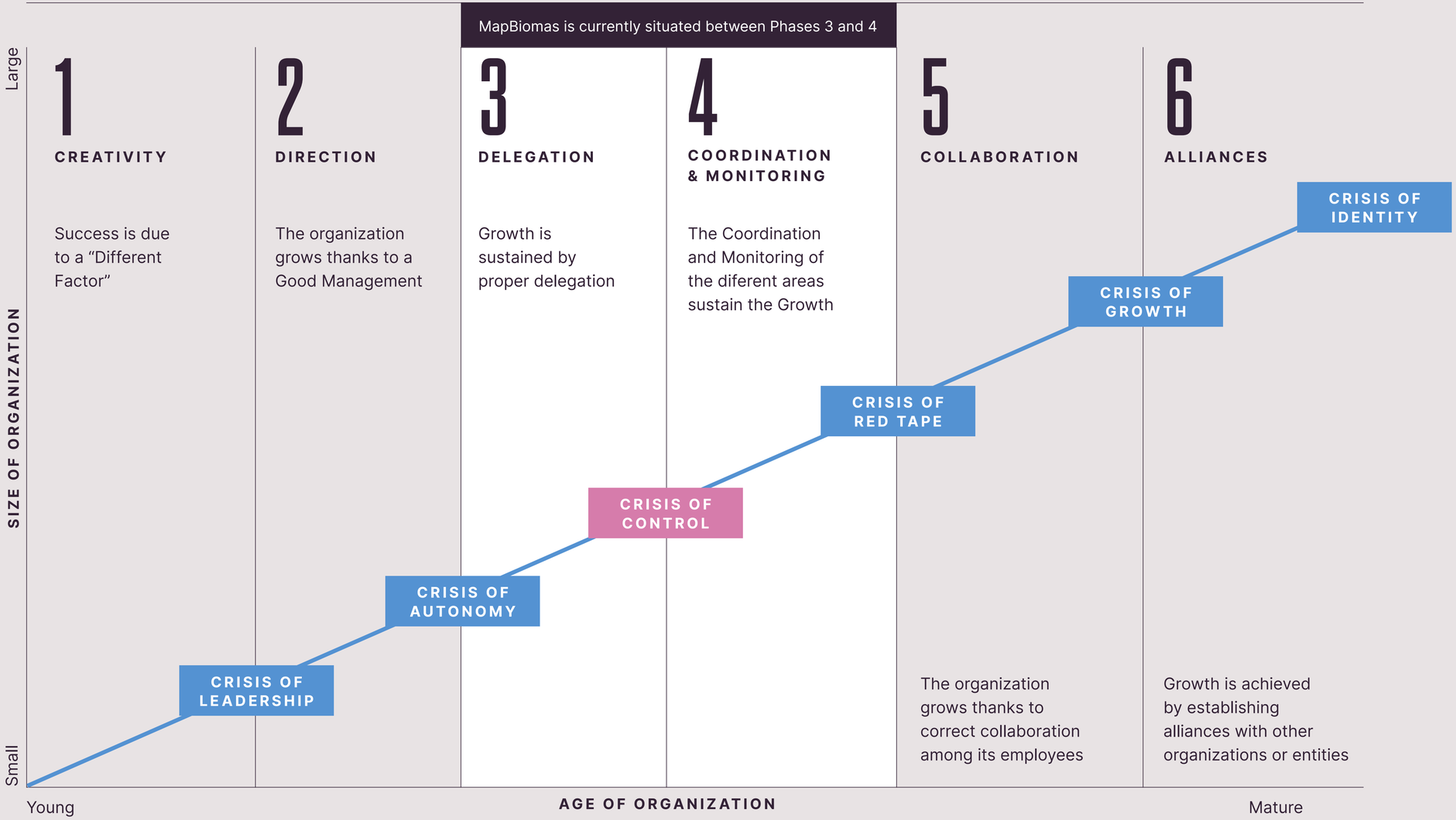


4.3

4.3.1 – THE MAPBIOMAS GROWTH TRAJECTORY

Organizational Theory points to a ‘crisis of control’ that occurs when an organization such as MapBiomas grows significantly over a relatively short period of time

MapBiomas is currently situated between Phases 3 and 4



Source: Greiner, L. E. (1972). Evolution and revolution as organizations grow. Harvard Business Review, 50(4), 37-46.

MB @ Phase 3, Delegation: Some delegation has occurred through the revised Coordination Team Structure.

MB @ Phase 4, Coordination and Monitoring: there is a move towards strengthening coordination and monitoring, but this needs to be accelerated if it is to accompany MapBiomas’ growth trajectory.

MB @ the Crisis of Control:
In Greiner’s model, the crisis of control is often triggered by external pressures, such as **rapid growth**, which strain the organization’s existing structures and processes. As the organization becomes more complex, the management team may struggle to maintain a clear understanding of the organization’s activities and to coordinate the efforts of its employees effectively.

At this stage, there is often a need to restructure the organization and **introduce new management systems** and processes to regain control. This can involve **delegating more responsibility to lower-level managers**, establishing **more formal procedures and policies**, and introducing **new systems for monitoring and evaluating performance**.

Note that **the response to a crisis of control is structure, process and management systems** across the organization, and not greater control by a small number of leaders.

FINDING

5

Strategic Alignment and the MapBiomas Growth Trajectory: being responsive to needs while aligning on a strategy

4.3.2 — Strategic Alignment

MapBiomas growth trajectory has largely been organic, based on the development of new products that are responsive to specific needs, and leverage existing opportunities, whether technical or based on synergies within the research groups. This **organizational agility is recognized to be an important strength** of the platform: it allows MapBiomas to better serve society and to remain in constant dialogue with pressing environmental issues.

However, the consequence of such a needs-based approach is a **perceived lack of alignment on strategy among the MapBiomas Executive Committee**. A lack of clarity about the MapBiomas strategy was a finding that appeared consistently across internal and external interviews and in the Collaborator thermometer Survey. In addition to strategy, there was a widespread **desire for greater clarity on priorities, engagement, budgeting and the decision-making process**. This challenge is further entrenched by intense workloads, and a self-reported lack of agency among coordinators.

RECOMMENDATIONS

→ **Enhance leadership alignment by means of the development of a strategic framework** that includes organizational priorities, decision-making, and M&E. In this was, the Executive Committee can become a strategic decision-making body with clarity of purpose and pathway.

→ Strategic alignment, meaning clarity and consistency about where MapBiomas is headed and how it will get there, is not inconsistent with an agile organization that is responsive to user needs. Along with greater strategic clarity, MapBiomas could **entrench a culture of a client-centric approach, where it responds to the needs of its main users, within a broader strategic framework**.

FINDING

6

Decentralized operations among different partners and working groups is a key success story for MapBiomas, and could be matched by a more collective process for strategic decision-making

4.3.3 — Devolved decision-making

MapBiomas experiences **a tension between very decentralized and flexible operational ways of working, and a centralized, almost personalized, strategic decision-making style**. Interviewees across the board recognize the critical and inspirational leadership role played by the general coordinator of MapBiomas, particularly in catalysing a decentralized network to deliver on the vision. However, senior managers within MapBiomas point out that there is still little decentralized decision-making, causing, sometimes, work overload and indecision. More decentralized decision-making will be important as the platform grows.

MapBiomas does not need to become more bureaucratic, but the proportion of resources invested in administrative and support roles has steadily declined over time (see graphic). There is some academic evidence to suggest that, **as organizations grow, they need to dedicate a higher proportion of resources to roles that cover engagement, coordination and strategic alignment**. At the same time, studies on Collective Impact, argue that **a robust 'Backbone Organization' is a critical element for collective impact**.

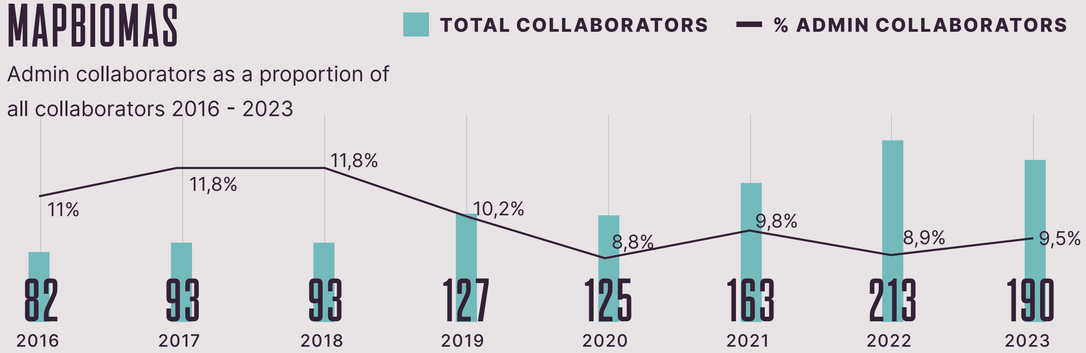
RECOMMENDATIONS

→ **Carry out a strategic planning process with the Executive Committee, that includes the global network**, and provides more clarity and alignment on MapBiomas collective goals and views for the future

→ **Strengthen and capacity build management teams** and **devolve and clarify decision-making processes**

MAPBIOMAS

Admin collaborators as a proportion of all collaborators 2016 - 2023



FINDING

7

MapBiomas' approach to nurturing a delivery network is perhaps its unique and exemplary feature: is this model possible in other countries with fewer established resources?

4.3.4 — Sustaining the Network Globally

Internal and external stakeholders recognize the **unique value of MapBiomas in the way it organizes itself by means of a network of civil society partner organizations**. The development of a global network has an enormous potential as it could drive the international standardization of maps and related information, thereby facilitating global initiatives (for NGOs, governments, regulations, etc).

Partners from the global network reported that the technical and methodological support provided by MapBiomas has worked incredibly well, thanks to the decentralized was of working, with close communication and support from the Brazilian team, particularly the technical coordinator. At the same time, **a sense of belonging and of "one global MapBiomas" is desired by partners.**

Issues around work overload and the capacity to deliver on time, from both the global network and the Brazilian supporting team have been raised, as well as issues of coordination and strategic communication. The development of the network committee with its periodic meetings, the establishment of a Network Coordinator and the Good Practices Guide have strengthened the network.

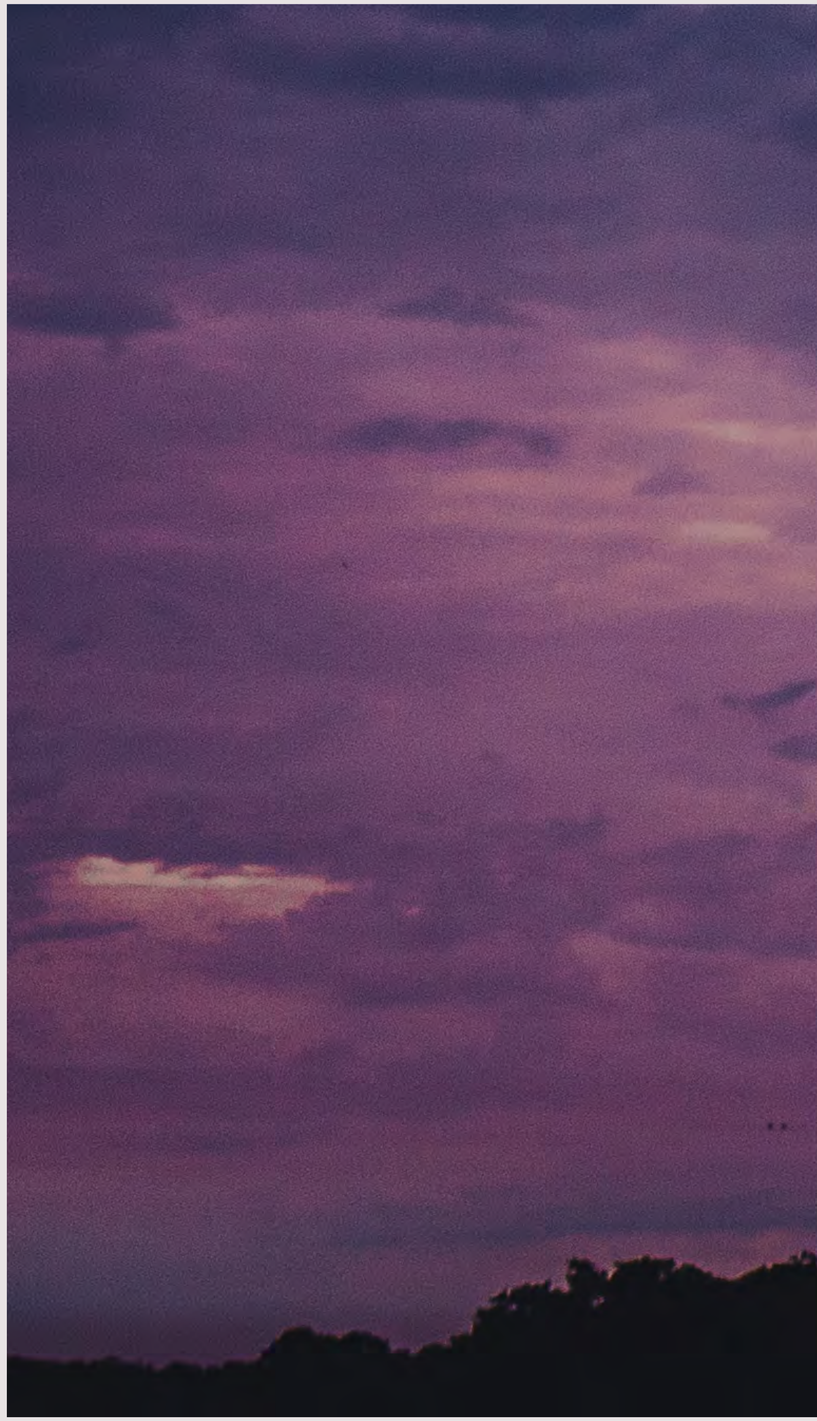
As MapBiomas expands to other regions, it must ask itself if the model that worked for Brazil can be replicated in third countries and globally. Brazil's particularities include a strong scientific community and civil society advocacy organizations; and strong leadership within MapBiomas at the national level. In comparison, it is recognized that MapBiomas has a critical role to play in Africa, given the current lack of reliable information and the future expansion of global agriculture on the continent, but it is less clear whether sufficient baseline capacity and funding exist. There are **concerns**, therefore, even amongst coordinators of other regions, that **the same level of quality, responsiveness and reach might not be possible outside of Brazil.**

It is worth assessing, in different contexts, if the inclusion of non-local organizations might be beneficial to the desired impacts. Long-term data and information providers, respected by local institutions could be considered as part of a broader network of collaboration.

RECOMMENDATIONS

→ In third countries, **explore more flexible arrangements relating to partner organizations**, including non-local partners, if appropriate. Develop a specific partnership model for Africa that reflects the different context, needs and capacities.

→ Establish moments in the year to share and discuss with the Network the plans for MapBiomas Brazil and the Network as a whole – as opposed to each individual region – to strengthen the understanding of the global project and harvest the collective intelligence of the network.



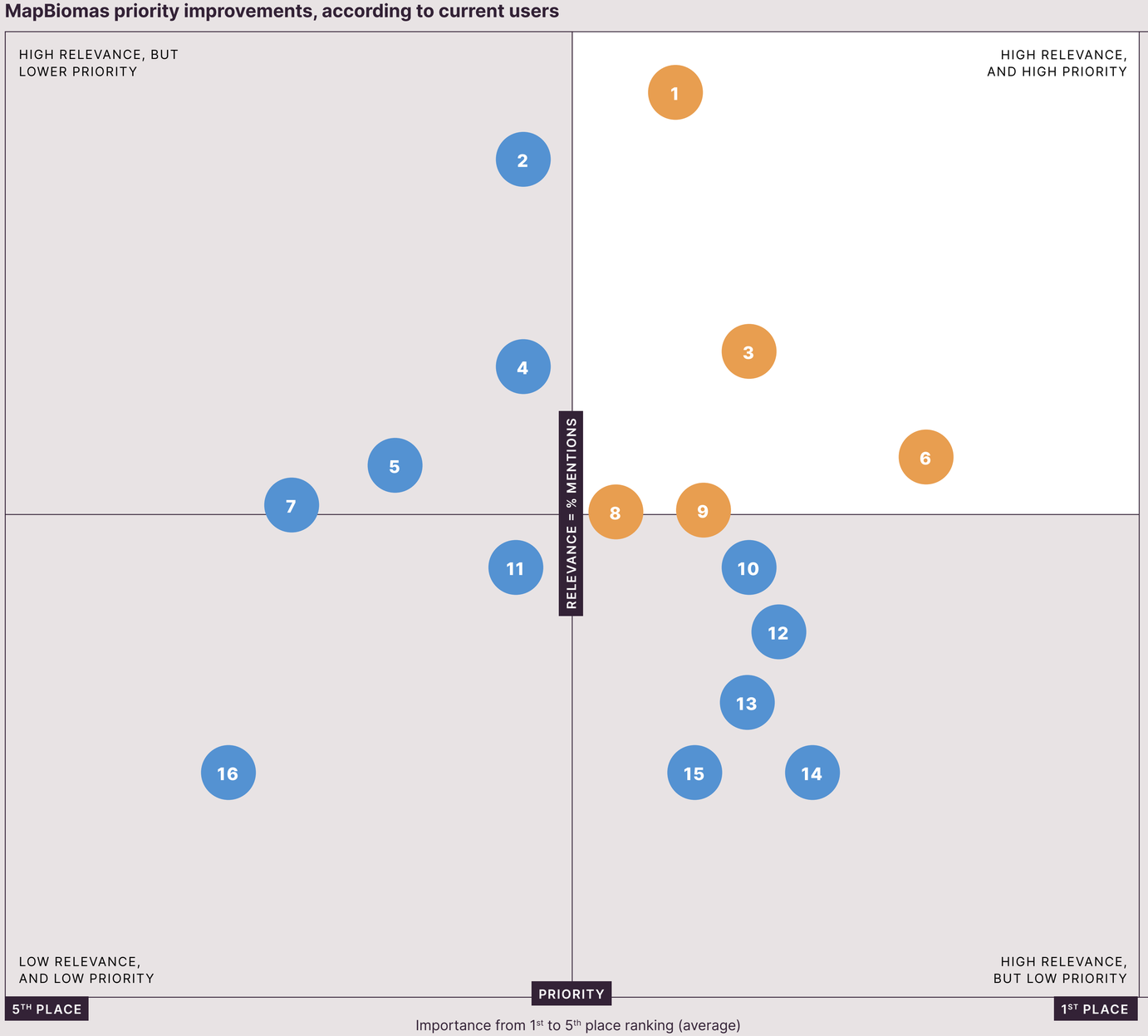
4.4

OPPORTUNITIES FOR THE FUTURE

4.4

4.4.1 OPPORTUNITIES TO IMPROVE MAPBIOMAS **A 2022 survey of 91 users identified more visual options, and capacity building for non-specialists as the top two opportunities to improve MapBiomas**

MapBiomas priority improvements, according to current users



Priority | High relevance, and high priority

1. More visual options (pixels/size and resolution of images) **2.88**
2. Inclusion of content from municipal environment secretariats **3.12**
3. Practical tutorials and lessons for non-specialists **2.75**
4. Support services for customization of information and specific studies **3.17**
5. Creation of a ‘validation seal’ to authenticate information: ‘Verified by MapBiomas’ **3.42**
6. Be official government partner, official sustainability tool **2.37**
7. Suggestions for complying with environmental obligations **3.50**
8. Include detailed information about biomes in South American countries **2.95**
9. Have the option of including data from your organization in a safe way **2.81**
10. Simplification of the registration and validation process via Google Engine **2.75**
11. Technical team provides immediate ‘customer support’ (e.g., via chat) **3.12**
12. Broadening of cooperation agreements to include other issues **2.63**
13. Quicker dissemination of Alerts, even if information is less accurate **2.76**
14. Division into ‘professional’ and ‘basic’ version (for non-specialists) **2.69**
15. Increase contact channels, decentralizing technical information **2.88**
16. Creation of an impartial role that can serve as the MapBiomas spokesperson in all areas of operation **3.64**

Results from 91 MapBiomas users who were asked: ‘Please choose, in order of importance the five potential improvements and changes to MapBiomas that are most relevant to your work’. Source: ‘5D - Estratégia de engajamento Fase 1: Pesquisa de mercado quantitativa’, December 2022

4.4.2 OPPORTUNITIES FOR SECTORAL ENGAGEMENT MapBiomas engagement with sectoral forums can be an effective means of scaling engagement, and closing any potential loopholes in sectoral agreements, where participation is not widespread

	SECTOR	FORUM	PURPOSE OF ENGAGEMENT
FEBRABAN	**Banking**	→ Febraban	→ Encourage all banks to sign-up to credit-linked zero deforestation schemes, thereby closing loopholes
WBC	**Soy Traders**	→ Soft Commodities Forum (SCF) → Agri-Traders' Roadmap	→ Demonstrate the benefits of MapBiomas in monitoring supplier compliance with land-use obligations → Offer MapBiomas tools to ensure delivery of the Agri-Traders' Roadmap → Offer opportunities to reach out to non-SCF members, thereby decreasing the risk of leakage or loss of competitivity for members
abiec	**Meatpackers**	→ ABIEC → Agri-Traders' Roadmap	→ Align data from Beef on Track with MapBiomas to set out pathway for delivery of the Agri-Traders' Roadmap → Offer opportunities to reach out to smaller meatpackers, thereby decreasing the risk of leakage or loss of competitivity for members
GTFI	**Meat sector**	→ Grupo de Trabalho dos Fornecedores Indiretos	→ Establish credible pathways to ensure compliance of indirect suppliers
The Consumer Goods FORUM	**Retailers and Brands**	→ Consumer Goods Forum	→ Use MapBiomas to assess both compliance and opportunities for investment in nature-based solutions, as well as tracking results in current investments
COALIZÃO BRASIL	**Public-Private Partnerships, Brazil**	→ Coalizão Brasil Clima Florestas e Agricultura – including the Traceability Working Group	→ Present MapBiomas as a tool that can support public-private partnerships including solutions for a national traceability system

Note that this list is not exhaustive, but is intended to serve as a starting point for the MapBiomas engagement team to prioritize collective forums to scale up interventions and close any sectoral loopholes

FINDING

8

Participation in the MapBiomas network helps partner organizations to leverage additional funding; the long-term funding plan for MapBiomas is less clear

4.4.3 — Partner Funding and Long-Term Funding

One of the less visible results of MapBiomas' way of working is **improved funding capacity for its partner organizations**. The platform acts as central hub and focus that is easier to communicate than is the work of individual projects, studies or organizations. MapBiomas itself benefits from widespread international recognition and respectability, and this permeates through to research partners.

Historically, **MapBiomas has been successful in guaranteeing medium-term funding for itself and its partners**. Collaborators are highly engaged and MapBiomas is perceived to add value to partners' personal and professional development. **Partner organizations reported that they were more financially resilient as a result of being part of the MapBiomas network**.

How the MapBiomas network will fund itself in the long-term is still unclear. This question was raised in the 2019 review, however a model for long-term financial viability was not subsequently developed. Although there is **consensus that MapBiomas should remain free for use and open access**, a practical proposal for how that can be achieved has not yet been put forward. Potential approaches might include **opening up to more collaborative funding strategies, to individual donations and/or to contributions from frequent heavy users** (as opposed to charging for access).

RECOMMENDATIONS

→ As part of the comms strategy, **be explicit about the value generated across knowledge and human resources as a result of being a part of the network**

→ For the coming year, **develop a robust multi-channel funding strategy**, with external support if required.

FINDING

9

MapBiomas as an enabler of other organizations; data is commonly used in conjunction with other data sets, with levels of integration between them considered reasonable

4.4.4 — Integration with other systems

The MapBiomas platform is often used in conjunction with other sources of data: it is uncommon for users to rely solely on the platform. This may be for a variety of reasons including: complementary data, such as social or economic data; period covered; level of detail; and a requirement for official data. The **integrations that were reported to be most beneficial to users are those that involve official and complementary data sets, such as SINAFLOR*, IBGE, the CAR Rural Environmental Registry,** etc.

MapBiomas is frequently included within other private and public platforms as part of a more customized experience**. It is third parties who are usually responsible for this kind of use and integration, and they reported that **MapBiomas was very supportive of such integrated efforts**, particularly when it comes to developing technological solutions and adaptations. The **pathways for ensuring such support are varied**, and usually happen informally, via direct contact with the General Coordinator or the Technical Coordinator; and occasionally more formally via technical agreements. The **process for prioritizing such requests was reported by MapBiomas collaborators to be unclear**.

RECOMMENDATIONS

→ MapBiomas could be **more active in reaching out for possible "customers" or partners, within a strategy designed with the desired final impact in mind**. By doing so, MapBiomas would be able to better focus its efforts and resources. Although MapBiomas demonstrates responsiveness and adaptability to spontaneous demands, it can sometimes create unnecessary urgency for the team. MapBiomas should not, however, relinquish its place as enabler and move to designing customized or paid tools – it is better positioned as a technical partner and provider for those services.

*Sistema Nacional de Controle da Origem dos Produtos Florestais: National System for Forest Products Origin Control
**Some examples mentioned were: Pasto ao Prato; app for Formigas de Embaúba, identifying urban areas for reforestation; DataZoom Amazonia; GFW-Pro; Tamo de Olho; National Water Agency; Agroicone Risk Map for Marfrig; Agrotools

FINDING

10

In Brazil, there is a gap in capacity building and education in remote sensing and information, with MapBiomas well positioned to fill it

4.4.5 — Capacity Building

A significant number of people that were interviewed as part of this evaluation expressed the belief that **MapBiomas has an unmet potential for providing training and education** to different audiences, including the academic community. At present, MapBiomas provides training upon request to partners, including government institutions, the media, and global network partners; as well as training as part of the launch strategy for new products or updated collections. Many stakeholders reported two complementary issues: in light of the lack of resources for INPE*, which traditionally provided academic training on remote sensing and mapping technologies, there is **a void to be filled in the professional development of young researchers and university students**; at the same time, the **general audience for MapBiomas still requires further training** and introductions to the overall system.

MapBiomas has an **extremely capable and experienced network of teachers and professors that could support a robust training system**, many of whom have voiced the desire to work together to bring more knowledge opportunities to students and researchers.

RECOMMENDATIONS

→ **Structure a formal training and education area, potentially as a MapBiomas spin-off**, that could cater to different levels of complexity and different objectives for engagement with the platform. The different educational offers could be tailored to particular audiences and their strategic application. There is a notable void at universities which MapBiomas is best positioned to fill. A starting point, suggested by some MapBiomas collaborators, would be a free on-line course, self-organized by current collaborators in the network.

FINDING

11

Future frontiers for MapBiomas include continued expansion of geographic scope and potentially a move into emerging themes around regeneration and restoration

4.4.6 — Strategic Opportunities

As MapBiomas moves into a more mature phase of its growth, innovation can be found in new geographies, and new strategies, which could use existing methodologies to further the purpose of improved sustainable natural resource management. Some of the most pressing emerging topics include: **regeneration and restoration** in the context of a growing level of interest in nature-based solutions; **expanding the work on water**, with implications for both the public and private sectors; and topics related to **carbon stocks and carbon markets**. In the Collaborators' thermometer Survey, some other suggestions were made including:

→ Maps that demonstrate **variations in coastlines**, thereby identifying erosion hotspots, linked to climate change and other causes;

→ Monitoring of **oceans**;

→ Degradation and areas of risk;

→ Opportunities to **monitor nature assets for conservation, and nature losses**, as a means of evaluating strategies for improved nature management and pasture recuperation, as well as the adoption of agricultural techniques that improve soil conservation;

→ More detailed information on land use conflicts and also conservation and restoration opportunities.

RECOMMENDATIONS

→ Identify those opportunities **where MapBiomas can most add value and fill a gap** that is not met by other stakeholders. When exploring new opportunities, MapBiomas should **remain open access** (free for use) **and open source**, so that users can be made accountable for their applications as well. There is space to explore **new forms of partnerships** that could catalyse changes in new areas.

* INPE - Instituto Nacional de Pesquisas Espaciais

PART 5

RECOMMENDATIONS

5

Photo: Nathan Anderson / Unsplash

MONITORING AND EVALUATION

1 **Create a Culture of Monitoring and Evaluation:** the Executive Committee can meet every six months to review all four sets of indicators, make strategic decisions and course correct.

2 **Hire or Identify an M&E Specialist within MapBiomas**: with responsibilities for coordinating monitoring and evaluation activities across the Executive Committee and communicating progress to the network.

3 **Review and Validate the M&E Tools proposed here**: the Executive Committee would ideally take ownership the findings of this report, and responsibility for follow-up including the adoption of the M&E tool set.

4 **Complete a Cycle of Indicator Gathering and Review**: the publication of this report marks the start of a new cycle of data gathering on progress and impact; this should be reviewed after one year, and adaptations made, as required.

STRATEGY AND ENGAGEMENT

5 **Adopt a user-centric approach to engagement**, that involves understanding better each one of the main user groups, their perspectives, needs and expectations: see for example Peter Drucker's work on customer focus.

6 **To scale up use of MapBiomas by business and industry, focus on sectorial initiatives and associations**, with a view to 'closing the fence', whereby the majority or all stakeholders in a sector are making strategic decisions about the sustainable management of natural resources. Supplement this work with capacity building and information sharing.

7 **Inform advocacy partners where gaps and needs exist**, thereby allowing partner organizations to be more strategic in their approaches to leveraging change in both the public and private sectors, and ensuring that MapBiomas and their partners 'stay within their lanes.'

8 **Develop a strategic plan for MapBiomas globally,** to guarantee greater alignment across the Executive Committee and among collaborators. The framework can include organizational priorities, decision-making, and M&E. In this way, the Executive Committee can become a strategic decision-making body with clarity of purpose and pathway. Off the back of the strategy, identify priority new 'customers' or partners with whom to engage.

GOVERNANCE AND FUNDING

9 Establish a more decentralized decision-making process, involving more managers and thereby taking some of the workload from coordinators. Give more clarity to the organizational structure and decision-making realms. This can be complemented by capacity-building for managers.

10 In third countries, **explore more flexible arrangements relating to partner organizations**, including non-local partners, if appropriate. A specific partnership model for Africa may make sense; one that reflects the different context, needs and capacities.

11 Develop a robust multi-channel funding strategy for the coming year, with external support if required.

12 Structure a formal training and education area, potentially as a MapBiomas spin-off, that could serve different levels of complexity and different objectives for engagement with the platform.

COMMUNICATION

13 Establish moments in the year to share and discuss with the Network the plans for MapBiomas Brazil and the Network as a whole – as opposed to each individual region – in order to strengthen the understanding of the global project and harvest the collective intelligence of the network.

14 Draw up and communicate yearly an overall vision of products, network and new initiatives.

15 Expand the availability of information on methodology and accuracy beyond the main Collection to include other products.

16 Continue and intensify efforts to make information more available to non-technical audiences, by regularly publishing an easy-to-understand explanation of each dataset and its limitations.

17 Explore ways to improve internal communication, including the results of the coordinators' meetings.

Photo: Dave Hoefler / Unsplash

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