

## Species of the plant communities of dry forest in the Colombia tropical Caribbean

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**Programme:** BID

**Project ID:** BID-CA2020-024-INS

**Project lead organization:** Fundación Desarrollo y Ambiente

**Project implementation period:** 1/7/2021 - 30/6/2023

**Report approved:** 22/8/2023

### Final Narrative Report

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#### Executive Summary

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• THE PROJECT FOLLOWED THE PROPOSED IMPLEMENTATION TO ACHIEVE THE OBJECTIVE. This is his most important achievement, as it demonstrates with its structure and coherence that a database can be made from the available information that allows showing the characterization of the vegetation through: the checklist of plant communities, the sampling event of their field plots, and the occurrence of plant species in these plots, which will have a high impact by showing, in the short and long-term, that the above can be implemented for all of Colombia, thus contributing in a profound way to the study of its vegetation and to its application to policies and programs.

• THE CONTEXT AND APPROACH ADOPTED FOR THE FINAL EVALUATION OF THE PROJECT is the comparison of the implementation and results with the proposal.

From which the main conclusions are, from the available vegetation studies it is possible to compile it, as follows:

1) The plant communities are compiled into a checklist of vegetation types. From each study a partial list is made, then the first list is compared with the second to get a synthesis of the two, which is then compared to the list from another source to get a new synthesis, and so, on to solve homonyms, synonyms and hierarchical classification of vegetation, and then a synthesis checklist of the vegetation types is made.

2) The plots, that make up a plant community, vegetation type, with the locations and geographic coordinates of site, date, plot author, and environmental conditions such as altitude, inclination, and others available, are organized into a data set of sampling -event, reordering the traditional composition tables, with the plots in the columns, in a table in the form of a list of these. Then, the data structure allows assigning to each event that is part of one community, by means of a vegetation type identifier all its attributes (variables) of it community.

3) Each plant (taxon) of a plot, has an amount, or value in the event, depending on the quantification method used. This can be compiled as a set of occurrences in list form, through reordering the traditional composition table, in matrixial way, in which the plots are the columns and the species are in the rows, plot vs taxa, such that each Plant species is registered as many times as it occurs in each plot, together with its value in it. Then, the data structure allows assigning to each taxon that occurred in a plot, by means of an event identifier, all its attributes (variables) of it event. Even through the relationship between the event identifier and the vegetation type identifier, it is possible to establish the relationship of fidelity or membership of each taxon with the various syntaxa that make up the vegetation classification.

4) The structure of the FUNDA vegetation database is compatible with Darwin Core and the GBIF IPT, this allowed learning from its important developments, to complement it and adjust it to it, making it more robust and universal.

5) The "IntegratedPublishingToolkit, IPT-GBIF" does not have a table, extension, that groups events into community types, similar to how occurrences can be grouped in a species Checklist. This implied that despite having created the Dataset of Types of plant communities, it could not be published in the "IPT". A limited solution to the above was to use the relevé extension, which is a complement of vegetation for the sampling events, where it can be expressed to which type of vegetation or syntaxon, a sampling event corresponds.

6) In any case, as explained in the project workshop, it is possible to partially recompose from the data downloaded from GBIF, event and occurrence, the information about the characterization of the vegetation. The FUNDA database, by having the list of vegetation types, allows a better recombination of the characterization of the vegetation, both the classification of its types and the traditional floristic composition table. In addition, in both situations, this recomposed floristic composition table has great potential for users, not only because they can carry out their own analyzes (always keeping in mind

that these tables in the information sources are a synthesis of data from field), but because now they can have in a single table, together and for large areas, all the data from the vegetation sampling events.

- **THE MAIN LESSONS LEARNED AND THE BEST PRACTICES IDENTIFIED:**

- 1) To compile the vegetation sources in a database, it is necessary to carry out a process where the concepts contained in the sources are consolidated as table with fields or extensions.
- 2) The table of list of types, or of plant communities, is the central table of a database of vegetation.
- 3) Each source must first be worked independently and then compared with the others, in pairs, so that the information is compiled systematically.
- 4) It is possible to recompose from the deliverables datasets both the information contained in each vegetation source, and to integrate the different sources with each other.
- 5) To extend the results of the project to different ecosystems in a country, it is necessary to have a qualified and sustained research group over time.

- **NO ADDITIONAL OBJECTIVES WERE IDENTIFIED DURING THE IMPLEMENTATION OF THE PROJECT.**

- **UNEXPECTED CHALLENGES DID NOT PREVENT FULFILLING THE OBJECTIVE OF THE PROJECT**, such as having tables, extensions, structured in a database, that compile the characterization of the vegetation. In particular, the following can be said:

- 1) Given the state of the information sources, the activities required deep and extensive procedures to have an adequate quality of the data presented in the tables of: types of plant communities, plots or sampling events, and occurrences of taxa in the events.
- 2) Although the Dataset of Types of plant communities was made, since the IPT did not have an extension, table, it could not be uploaded and mapped. However, this deliverable is available in the FUNDA database, as shown in the workshop. It should be made clear that FUNDA does not have an online database.

- Among the activities after the project, it is intended to continue with this compilation of the dry forest vegetation of the Colombian Caribbean during the month of July 2023, which will allow improving the activities and deliverables. FUNDA made an alliance with the University Corporation Minuto de Dios UNIMINUTO, which will possibly contribute to improving the results of this project.

In the future, the purpose of FUNDA is to manage other alliances to complete, following the same method of this project, the compilation of the vegetation of other ecosystems of the tropical Caribbean of Colombia such as humid forests, aquatic vegetation, beaches, mangroves and others. In particular, FUNDA will continue with the compilation and map of the vegetation of the Colombian Caribbean through the call for volunteers, which is very well received.

## Progress against milestones

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**Has your project completed all planned activities?: No**

**Has your project produced all deliverables: No**

**Rationale:** Some deliverables of the proposal were not completed due to both difficulties in comparing information sources, due to their own limitations, and deficiencies in their contents. This delays: 1) the list of plant communities, making it difficult to solve homonyms, synonymies, and the hierarchical classification of vegetation; 2) the location and georeferencing of the sampling events and 3) the spelling verification of all the scientific names in the table of occurrences. In addition, the absence in the IPT of an extension of biological communities should be partially corrected, making the extension relevant, not considered in the proposal. These situations prevented the publication.

FUNDA will continue with the remaining deliverables after the end of the project, during July 2023, and in the future, possibly in partnership with UNIMINUTO, or through volunteers.

## Report on Activities

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### Summary of the implementation of the project activities

- **ACHIEVEMENTS OF THE ACTIVITIES:**

According to the project proposal, the following activities were carried out:

- 1) The IDB Workshop was taken.
- 2) The mid-term report was made.
- 3) The Virtual training workshop for Colombia Caribbean was organized, for which its presentation was

made in pdf, which was disseminated among scientists, state entities, NGOs and others, attached.

<https://biodiversidad.co/comunidad/proyectos/bid/comunidades-de-plantas/>

Presentations were prepared according to the agenda, attached.

4) The current final report was prepared.

• NEW ACTIVITY:

The new activity to make the extension or table was implemented, relevé, according to Darwin Core, which was uploaded and mapped in "IntegratedPublishingToolkit, IPT-GBIF". This extension requires for each event variables such as the coverage of the vegetation strata, and what is essential for this project, the name of the community to which the event belongs, in particular the syntaxonomic name of the type of vegetation.

• DELAYED ACTIVITIES:

TYPES OF PLANT COMMUNITIES, CHECKLIST

(1) The cause of the delay in this activity was due to the difficulties in comparing the sources of information, since several of the sources of information have limitations regarding the citations between themselves, causing difficulties in the traceability of the studies. of vegetation to each other; in particular regarding the characterization of plant communities. In addition, in some cases there are deficiencies in the contents of these available sources. All of the above delayed the development of a single list of plant communities, which resolves homonyms, synonymies, and the hierarchy of vegetation classification. In addition, due to the need to partially correct the absence in the IPT of an extension for the list of biological communities, the relevé extension had to be made, not considered in the original proposal.

(2) This delay in the activity did not have an impact on the objectives of the project, since with what has already been done it allows demonstrating the essentials of the objectives.

(3) This activity is expected to be implemented in part after the project, during the month of July, and then with possible alliances for new financing.

PLOT AND THEIR LOCATION, SAMPLING-EVENT

(1) The cause of the delay in this activity was due to the difficulties in comparing the sources of information, since several of the sources of information have limitations regarding the citations between themselves, causing difficulties in the traceability of the studies. of vegetation to each other; in particular regarding the location and georeferencing of the vegetation plots. In addition, in some cases there are deficiencies in the contents of these available sources. To solve the above, a complex procedure had to be created that includes; first, to create a basic digital cartography of the Colombian Caribbean; second, to consolidate all the sources about the location and georeferencing of the sampling events from the traditional floristic composition table, from additional event location tables presented in the reference sources, from texts from the same reference sources, including the texts and tables of the events from the original sources and other studies in this regard, all of which is consolidated in what we call the composition-location table: third, evaluate and decide on the location and georeferencing of the events with respect to to the aforementioned basic cartography, and fourth, to implement the decision and homogenize the location and georeferencing of each of the sampling events.

(2) This delay in the activity did not have an impact on the objectives of the project, since with what has already been done it allows demonstrating the essentials of the objectives.

(3) This activity is expected to be implemented in part after the project, during the month of July, and then with possible alliances for new financing.

SPECIES OF THE PLOTS OF PLANT COMMUNITIES, OCCURRENCES

(1) The cause of the delay in this activity was due to spelling errors found in some of the scientific names of the occurrences of the taxa present in the sampling events. This involved verifying the spelling of all the scientific names of the mentioned occurrences, by comparing them with the scientific names from specialized sources, both flora texts and online databases, to evaluate and make decisions about whether or not to correct the spelling of each scientific name.

(2) This delay in the activity did not have an impact on the objectives of the project, since with what has already been done it allows demonstrating the essentials of the objectives.

(3) This activity is expected to be implemented in part after the project, during the month of July, and then with possible alliances for new financing.

PUBLICATION:

(1) The cause of the delay in this activity was due to the delay in the three previous activities already mentioned.

(2) This delay in the activity did not have an impact on the objectives of the project, since with what has already been done it allows demonstrating the essentials of the objectives.

(3) This activity is expected to be implemented in part after the project, during the month of July, and then with possible alliances for new financing.

### Completed activities

#### Activity: BID Workshop

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**Description:** The Biodiversity Data Mobilization Course was taken and the Advanced Badge certification was obtained.

**Start Date - End Date:** 1/7/2021 - 30/9/2021

**Verification Sources:**

<https://openbadgfactory.com/v1/assertion/b0510823d3170a010dcb2be82df6acb771a2165f>

#### Activity: Types of plant communities, Checklist

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**Description:** - Types of plant communities, Checklist

The characterization and classification of vegetation types was transcribed and arranged in tables from each of the sources used, attachments in this final report:

"Fuentes Caribe Colombia-Available Information\_Veg\_Amb-Veg\_Eco\_6"

- Which were compared with each other to obtain a single table of Types of plant communities

- Activity is delayed because some of the information sources present inconsistencies and sometimes errors in the vegetation classification proposed in them, particularly when compared the vegetation classification and their geography within each source: summary, text results, composition and locality tables, and end discussion. In addition, this activity required more work than expected to coordinate with the vegetation types, of tropical Caribbean dry forest included in the FUNDA database of vegetation types, to avoid synonyms and homonyms, and thus be able to assign a unified identifier of the vegetation type.

**Start Date - End Date:** 1/7/2021 - 25/6/2023

**Verification Sources:** The characterization and classification of vegetation types was transcribed and arranged in tables from each of the sources used, attachments in this final report:

"Fuentes Caribe Colombia-Available Information\_Veg\_Amb-Veg\_Eco\_6"

#### Activity: Plots and their location, Sampling-Event

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**Description:** Compile the plots and their location, of the types of plant communities of dry forest in the Colombia tropical Caribbean, identifying their geographical coordinates.

**Start Date - End Date:** 1/7/2021 - 25/6/2023

**Verification Sources:** The characterization and classification of vegetation types was transcribed and arranged in tables from each of the sources used, attachments in this final report: "Fuentes Caribe Colombia-Available Information\_Veg\_Amb-Veg\_Eco\_6"

#### Activity: species of the plots of plant communities, Occurrences

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**Description:** Compile the plant species and their geographical coordinates, located in the plots of their communities, of dry forest in the Colombia tropical Caribbean.

**Start Date - End Date:** 1/7/2021 - 25/6/2023

**Verification Sources:** The characterization and classification of vegetation types was transcribed and arranged in tables from each of the sources used, attachments in this final report: "Fuentes Caribe Colombia-Available Information\_Veg\_Amb-Veg\_Eco\_6"

#### Activity: RELEVÉ EXTENSION\_Plots and their location, Sampling-Event

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**Description:** Compile the plots and their relevé: strata coverage, aspect, inclination, syntaxonName\_RelvéDarwinCore, of the types of plant communities of dry forest in the Colombia tropical Caribbean, identifying their geographical coordinates.

**Start Date - End Date:** 1/4/2022 - 25/6/2023

**Verification Sources:** The characterization and classification of vegetation types was transcribed and arranged in tables from each of the sources used, attachments in this final report: "Fuentes Caribe Colombia-Available Information\_Veg\_Amb-Veg\_Eco\_6"

#### Activity: Midterm Report

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**Description:** Preparation of Midterm Report.

**Start Date - End Date:** 1/4/2022 - 31/5/2022

**Verification Sources:** Midterm Report

#### Activity: Virtual training workshop for Colombia Caribbean

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**Description:** Training workshop about species datasets of the plots of plant communities. Aimed at scientists and technicians, from public and private institutions, related to research and management of flora and vegetation. There will be an evaluation of the oral presentations of the participants.

**Start Date - End Date:** 15/6/2023 - 16/6/2023

**Verification Sources:** schedule and Presentations, attachment in this directory of this final report: "Virtual training workshop for Colombia Caribbean"

And

Ricardo Ortíz Gallego

<https://humboldt-org-co.zoom.us/j/83641435466>

SiB Coloombia

Investigador Adjunto, Gerencia de Información Científica

Instituto de Investigación de Recursos Biológicos

Alexander von Humboldt

### Activity: Final report

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**Description:** Make the final report of the project, which contains objectives, concepts, methodology, activities and results. Disseminate the report among people and entities related to management of flora and vegetation.

**Start Date - End Date:** 1/5/2023 - 29/6/2023

**Verification Sources:** Final report

### Activity: Publication

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**Description:** Publish of datasets through GBIF.org referring to: 1) the sampling-event of the plant communities plots, 2) RELEVÉ of the sampling-event of the plant communities plots, and 3) the plant species occurrence from the plant communities plots.

**Start Date - End Date:** 1/9/2022 - 29/6/2023

**Verification Sources:** [https://ipt.gbif.org/resource?r=compilacion\\_vegetacion\\_caribe\\_colombia\\_1](https://ipt.gbif.org/resource?r=compilacion_vegetacion_caribe_colombia_1)

## Report on Deliverables

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### Deliverables - Summary

Since the deliverables are related one to one with the activities, this summary will be limited to the essential ones with respect to what has already been said in the summary of implementation of the activities.

- **ACHIEVEMENTS OF THE DELIVERABLES:**

- 1) Advanced Badge was obtained at the IDB Workshop.
- 2) The mid-term report was delivered.
- 3) The Virtual training workshop for Colombia Caribbean was held, with 21 participants from Colombia, Ecuador and Bolivia, for 2 days and 10 hours.
- 4) The final report was delivered.

- **NEW DELIVERABLE:**

The relevé dataset was made that complements the sampling events.

- **DELAYED DELIVERABLES:**

#### TYPES OF PLANT COMMUNITIES, CHECKLIST

(1) The cause of the delay of this deliverable was already stated in the implementation summary of its respective activity.

(2) This deliverable is expected to be partially completed after the project, during the month of July, and then, if possible, with alliances for additional financing.

#### PLOT AND THEIR LOCATION, SAMPLING-EVENT

(1) The cause of the delay of this deliverable was already stated in the implementation summary of its respective activity.

(2) This deliverable is expected to be partially completed after the project, during the month of July, and then, if possible, with alliances for additional financing.

#### SPECIES OF THE PLOTS OF PLANT COMMUNITIES, OCCURRENCES

(1) The cause of the delay of this deliverable was already stated in the implementation summary of its respective activity.

(2) This deliverable is expected to be partially completed after the project, during the month of July, and then, if possible, with alliances for additional financing.

#### PUBLICATION:

(1) The cause of the delay in this deliverable was due to the delay in the three previous activities already mentioned.

(2) This deliverable is expected to be implemented in part after the project, during the month of July, and then with possible alliances for new financing.

## Dataset deliverables

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### Types of plant communities

**Dataset type:** Checklist

**Dataset scope:** List of plant communities, with sin-taxonomic or similar names, of dry forest in the Colombia tropical Caribbean, with author and year of characterization.

<https://www.gbif.org/dataset/ffb1fe93-b1e9-4a16-8948-9cdf6bf7860e>

**Number of records:** 58

**Data holder:** Fundación Desarrollo y Ambiente FUNDA

**Data host institution:** GBIF data publisher, and Fundación Desarrollo y Ambiente FUNDA

**% complete:** 77%

**Status update:** update

**DOI:** 10.15472/I029qu

**Expected date of publication:**

### Plots and their location

**Dataset type:** Sampling Event

**Dataset scope:** Plots of the previous plant communities types, with their location according to exact or estimated geographic coordinates; as well as the exact date or year in which the plot was made, otherwise, the source publication year from which the information was obtained is presented.

<https://www.gbif.org/dataset/ffb1fe93-b1e9-4a16-8948-9cdf6bf7860e>

**Number of records:** 228

**Data holder:** Fundación Desarrollo y Ambiente FUNDA

**Data host institution:** GBIF data publisher, and Fundación Desarrollo y Ambiente FUNDA

**% complete:** 76%

**Status update:** update

**DOI:** 10.15472/I029qu

**Expected date of publication:**

### Species of the plots of plant communities

**Dataset type:** Occurrences

**Dataset scope:** Occurrences of plant species in plant communities plots of the dry forest in the tropical Caribbean of Colombia. <https://www.gbif.org/dataset/ffb1fe93-b1e9-4a16-8948-9cdf6bf7860e>

**Number of records:** 5,328

**Data holder:** Fundación Desarrollo y Ambiente FUNDA

**Data host institution:** GBIF data publisher, and Fundación Desarrollo y Ambiente FUNDA

**% complete:** 76%

**Status update:** update

**DOI:** 10.15472/I029qu

**Expected date of publication:**

### RELEVÉ EXTENSION\_Plots and their location, Sampling-Event

**Dataset type:** Sampling Event

**Dataset scope:** RELEVÉ of the Plots of the previous plant communities types.

<https://www.gbif.org/dataset/ffb1fe93-b1e9-4a16-8948-9cdf6bf7860e>

**Number of records:** 228

**Data holder:** Fundación Desarrollo y Ambiente FUNDA

**Data host institution:** GBIF data publisher, and Fundación Desarrollo y Ambiente FUNDA

**% complete:** 76%

**Status update:** update

**DOI:** 10.15472/I029qu

**Expected date of publication:**

## Other deliverables

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### BID Workshop

**Description:** Deliverables required by BID Capacity enhancement Workshop

**% complete:** 100%

**Status update:** update

**Sources of verification:**

<https://openbadgfactory.com/v1/assertion/b0510823d3170a010dcb2be82df6acb771a2165f>

### Midterm Report

**Description:** Midterm Report, Publication of one dataset through GBIF.org, and attendance of a project team member at BID Capacity Enhancement Workshop.

**% complete:** 100%

**Status update:** update

**Sources of verification:** Mid-term Report digital document, with attachment about the publication of One dataset through GBIF.org, and Digital Certification at BID Capacity Enhancement Workshop.

### Publication

**Description:** Publication through GBIF.org of datasets: sampling-event, relevé and occurrence.

**% complete:** 77%

**Status update:** update

**Sources of verification:** [https://ipt.gbif.org/resource?r=compilacion\\_vegetacion\\_caribe\\_colombia\\_1](https://ipt.gbif.org/resource?r=compilacion_vegetacion_caribe_colombia_1)

### Training virtual workshop for Caribbean of Colombia

**Description:** Program of training virtual workshop on datasets considered in the project. List with the signature of those attending the workshop.

**% complete:** 100%

**Status update:** update

**Sources of verification:** [https://humboldt-org-co.zoom.us/rec/share/oHYoMqOvJpyEwX5y9Ei7iQo5Xq05BiB6OTZ9Wo57ZQNLhBnX1pIWUxGpKqaKi4TM.cWCiE8qa3w782](https://humboldt-org-co.zoom.us/rec/share/oHYoMqOvJpyEwX5y9Ei7iQo5Xq05BiB6OTZ9Wo57ZQNLhBnX1pIWUxGpKqaKi4TM.cWCiE8qa3w782/Código%20de%20acceso%3A%20TdTpK#0+)  
/ Código de acceso: TdTpK#0+ [https://humboldt-org-co.zoom.us/rec/share/9Ob0-49lxkYJpaov\\_dG1vD9ebYMwJfKPEBs6zFnWNH5C633gZsNKgmG\\_-\\_SOTAJH.kMd4-bQk8G5pbnK6](https://humboldt-org-co.zoom.us/rec/share/9Ob0-49lxkYJpaov_dG1vD9ebYMwJfKPEBs6zFnWNH5C633gZsNKgmG_-_SOTAJH.kMd4-bQk8G5pbnK6/Código%20de%20acceso%3A%20TdTpK#0+)  
/ Código de acceso: TdTpK#0+

### Final Report

**Description:** Final report containing objectives, concepts, methodology, activities and results

**% complete:** 100%

**Status update:** update

**Sources of verification:** GBIF Dashboard

## Events

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### III Simposio en ecología de la vegetación: Mapas Nacionales de la Vegetación Natural - XI Congreso Colombiano de Botánica

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**Dates:** 2022-11-10 - 2022-11-10

**Organizing institution:** Fundación Desarrollo y Ambiente FUNDA

**Country:** Colombia

**Number of participants:** 37

**Comments:** attachments

**Website or sources of verification:** <https://www.gbif.org/event/9bf8a6-6a2d-456f-bc66-dadb556/iii-symposium-on-ecology-of-vegetation-national-maps-of-natural-vegetation-in-spanish-only>

## Events

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### Virtual training workshop for Colombia Caribbean

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**Dates:** 2023-06-15 - 2023-06-16

**Organizing institution:** Fundación Desarrollo y Ambiente FUNDA

**Country:** Colombia

**Number of participants:** 21

**Comments:** Attachments

**Website or sources of verification:** <https://biodiversidad.co/comunidad/proyectos/bid/comunidades-de-plantas/>

## Communications and visibility

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After the project implementation, the plan to promote and communicate the activities and Deliverables of the project includes:

- 1) Seek funding to write and submit the publication about the project data sets, on the GBIF network that publishes data.
- 2) Through FUNDA website (under construction), mass email and social networks, FUNDA will communicate among different actors the links of data published through GBIF.org, as well as its relationship with the version of Natural Vegetation Map of Colombia that FUNDA is preparing, and its implications for a vegetation national map made by a broad and democratic scientific community. These actors include government officials (for example IAvH, SiB Colombia and others), scientists, Universities, NGOs, and the participants in Training virtual workshop for Caribbean of Colombia.
- 3) FUNDA did the III Vegetation Ecology Symposium, in Colombia, where the structure of the data sets of this project was presented, which contributes to organizing the information of the Colombia plant communities and their natural vegetation map. FUNDA is preparing the IV Vegetation Ecology Symposium for the year 2024.

## Monitoring and evaluation

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### Final Evaluation

- 1) Regarding the evaluation of the project activities and its deliverables, it can be said that despite the



delays explained, the project managed to cover most of the types of vegetation, sampling events and occurrences of the dry forests of the tropical Caribbean from Colombia. The procedure developed during the project allows its application to other regions of Colombia and the world in reference to compiling the characterization of the vegetation in databases.

2) Regarding the implementation of the project, it was done efficiently with respect to the available resources, effectively with respect to the objective achieved, supported by the strength of the conceptual structure, the FUNDA vegetation database, and especially in the quality of the research group organized for this project.

3) The project is relevant for partners and interested parties, such as the scientific community in the study of vegetation, government entities, interested citizens, the Minuto de Dios UNIMINUTO University Corporation, and FUNDA researchers, as it demonstrates that it is possible to compile the characterization of the vegetation in a database and use it for research and applications in large areas by integrating the different sources of information.

4) Regarding the use of the relevé extension, to partially correct the absence of an extension about the types of biological communities in the IPT, FUNDA will be attentive to follow up on the solutions in this regard.

5) There has been good disposition for the management of the project by the GBIF Secretariat. FUNDA has expressed in detail to officials of the Instituto de Investigación de Recursos Biológicos Alexander von Humboldt", IAvH, and the Node of GBIF Colombia, the importance of compiling vegetation information sources both for its characterization, and for the consolidation of data from large areas of the territory at the service of research and its applications to policies, plans and programs.

6) The main success on which to build, after the implementation of the project, is to have demonstrated that the sources of vegetation information can be compiled, in a database about the characterization of the vegetation, whose data are now integrated to investigate and make applications in large areas. For this, the best practice identified is to consolidate and maintain research groups over long periods of time, supported by the construction and adjustment of work protocols.

7) What was said in the previous point is the main lesson of the project's experience, and the basis for its application in other contexts, such as other regions of the country and Latin American nations.

8) The conclusion of the experience of the implementation of the project is that the available information sources can be compiled, or use the information already stored in GBIF, in order to characterize different biological communities through the construction of tables of types of communities, events and occurrences, related to each other, with unprecedented potential for research and application. Therefore, it is recommended that the GBIF Secretariat and the SiB Colombia Node consider disseminating the results and methods developed during this project, not only to reinforce its success, but also to broaden it to different parts of the biodiversity spectrum.

### Best Practices and Lessons learned

For this project, referred to the compilation of information sources to present the characterization and data of the vegetation, it is necessary to have a qualified work group, and sustained over time, focused on identifying the types of vegetation, their events of sampling and occurrences that compose them.

### Post Project activities

1) Maintain a research group on the types of vegetation of the Colombian Caribbean, with volunteers and other entities interested in participating.

2) Maintain the communication, monitoring and sustainability plans of the project.

3) Seek alliances that allow carrying out new projects related to the vegetation of the dry forest of the tropical Caribbean of Colombia and with the vegetation of other ecosystems in this region.

## Sustainability

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### Sustainability Plans

The sustainability plan includes:

1) the Initiative for Vegetation Study and its Applications to Policies and Plans in Colombia now is promoted by Fundación Desarrollo y Ambiente FUNDA; who continues to promote the development of a broad and democratic scientific community for the study of vegetation through a Plan to build the map of Colombia natural vegetation and its application to policies.

2) FUNDA is making a version of Natural Vegetation Map of Colombia with an approximation of Vegetation Ecology. This will force the compilation of a plant communities checklist throughout the country, and their sampling-event for field plots. If in the future it is required, based on the above, the occurrences data set of plant species can be made, from plots of plant communities of Colombia. Demand for these data may stimulate its financing.

2) We hope to participate in future GBIF calls.

3) The project Deliverables will be presented on the FUNDA website (under construction) through links to the data sets published through GBIF.org, seeking financial support to continue the process.

4) If another institution agrees to support the construction of the National Map of Natural Vegetation supported by a broad and democratic scientific community, the current project will be key to structuring its data, with deep applications to policies and plans where different biodiversity levels are considered: species, communities, habitats and ecosystems. Thus, the map construction would have a high potential to obtain financial resources, oriented to produce data sets such as those required by GBIF.



## Impact of COVID-19 pandemic on project implementation

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The COVID-19 pandemic and the subsequent situation led to higher computer costs, which affected the acquisition of the equipment required for the project, and therefore the efficiency in data management.

The donation of the computer by UNIMINUTO has been of great benefit, however, it is still necessary to improve or update some of its parts, after the completion of the project, to achieve best data management, now and in the future. Since the compilation of information sources on which the research of FUNDA is based, causes the computational requirements to increase exponentially, respectfully suggest that I be authorized to continue with the eligible expense that is pending to purchase the missing parts of the computer.

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