Evaluation of the Dutch Caribbean Biodiversity Database: User perspectives
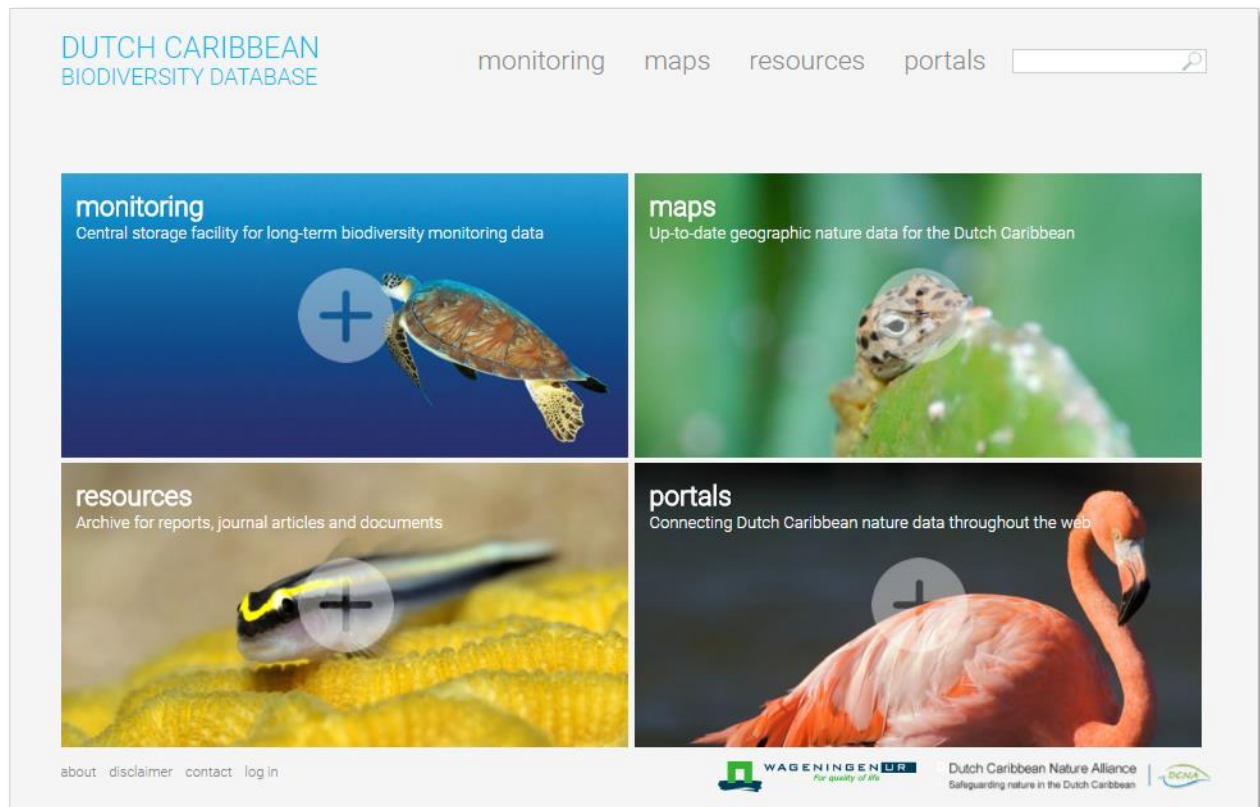
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30 March 2020

Summary

Key findings

The Dutch Caribbean Biodiversity Database (DCBD) has evolved from its original intent of mainly data rescue to fulfil a broader range of local and national policy needs. While the primary original intent was to provide a data repository and back up to limit loss of data, the DCBD now provides an important synthesis of evidence for local and national policy and communication. The range of uses include: policy reporting at national and local levels, demonstrating the benefits of long-term data for decision making, engaging with local islanders around management issues, and providing a portal for engaging with local communities and tourists. Over half of the respondents use DCBD to access already-synthesized indicator data (61%) and reports and publications for the Dutch Caribbean (50%). Respondents indicated that their interest was more focused on reports and grey literature that they cannot find via websites elsewhere, e.g. student theses.

> *"I am a user not an analyser – there are no other synthesis places where I can go"*

> *"I like to use the synthesis on DCBD to show people the data and how it is used; the monitoring indicators and maps are really nice - I can click on the links and see straight away"*

> *"DCBD helps people to share [information]"*

DCBD remains a critical data repository for almost 20% of its users. DCBD plays a critical role in limiting the risk of data and investment loss in a data environment where there is no regular and planned data backup facility and high staff turnover. Seventeen percent of the respondents mentioned that DCBD performs the function of a systematic and regular back up facility for the data collected on the islands. Even the process of putting data onto DCBD creates an important space for data collectors to go through the discipline of consolidating and recording their data. An explicitly-planned and regular process for collecting data from suppliers and helping them add it to DCBD would enhance this function. This process should also explore new ways to create this space, without the necessity to 'burn carbon' between the Netherlands and the islands. For example, while face-to-face meetings still remain the most preferred form of information exchange on the islands, a meeting space that combines physical and virtual participants may be possible if hosted by a local island organization.

> *"If we have a fire, or files get lost, we don't have back up. I feel good knowing that our data that we have spent a lot of time collecting is stored somewhere else too"*

> *"People are caught up in their work and forget to put the information on – it is a good reminder"*

DCBD has an encouraging pipeline of new and experienced users which can leverage a vibrant community of practice for nature inclusive activities on the islands. 33% of the respondents had used DCBD for less than five years, a further 33% had between five and ten years of experience using DCBD, and 22% of the respondents had been part of its original scoping and development. This indicates that the DCBD continues to be a relevant tool that is attracting a new user base. Local early career scientists, who were not involved in the initial scoping and development of DCBD, also expressed a need for capacity development, not only around DCBD as a tool, but also to support learning about its content (e.g. indicator and statistical concepts) and broadening their exposure to science-policy networks. Combining such a

capacity development initiative with regular data collection processes could generate a vibrant science community of practice on the island that facilitates policy-relevant and robust science. This community of practice could collectively grow a more systematic approach to collecting the data required for decision making and reporting around nature-inclusive activities on the islands. Creating a cross-sectoral space for scientists and practitioners to interact and broaden their own perspectives and networks also offers further incentive to DCBD's existing data collectors.

> *"There are islands within the islands and everyone is in their own silos – I like to see more communication between the NGOs and the sister islands"*

> *"I would like training on how to generate trends and stats on my own data"*

> *"It is like a huge extra step to give the data…there is no incentive…only the end product is beneficial to share"*

DCBD should remain positioned as a source of credible and scientifically-robust evidence for decision making. In the discussions around both the awareness and dissemination needs and the provision of factsheets on DCBD, many of the respondents expressed the need for a credible science base. They indicated that care should be taken to present the science and not advocate a particular view. This discussion also highlighted the complementary roles of DCBD and the Dutch Caribbean Nature Alliance (DCNA), which has an outreach programme that provides news articles and stories on environmental issues. While the respondents supported broadening indicators and developing factsheets on topical issues, they did not want to have these seen as "narratives" or "storylines" as they expressed concern that this did not convey credible science evidence base.

> *"The nice thing about DCBD is that it based on science"*

DCDB is positioned in a local niche to meet the needs of the Dutch Caribbean – local is lekker: All respondents felt that global linkages were better covered elsewhere. Most of the respondents (83%) felt that the local specificity of the DCDB was its main strength, or that it should only be broadened where there were implementation dependencies at a regional level. Some 84% of the respondents indicated that they use DCBD as a means of finding out about new science that is taking place on the islands, as it is the only place where they can get a good overview of new student projects and theses that are not usually added to the general internet. There is a strong view to keep the 'local is lekker' feeling and to enhance the grey literature (including student theses) on the DCBD.

> *"There is google for regional and global and everything else"*

Broader cross-sector awareness and dissemination is viewed as a priority strategic direction for DCBD. Growing the awareness and dissemination of DCBD was the most frequently-mentioned need indicated by respondents (60%). At present DCBD is mainly used by nature scientists and there is scope for broadening this to: (1) inform policy and decision making in sectors beyond nature (e.g. tourism, spatial and environmental planning, agriculture and fisheries); and (2) to support outreach for public awareness of environmental issues. Growing group (1) was considered to be the most important focus for DCBD, which will require active and specific engagement by the DCBD development team with different relevant sectors. In growing group (2), the general feeling was to leverage outreach programmes of existing DCBD users.

"The [DCBD] website needs to be made more known on the islands to other government departments – local nature policy officers may know it, but many of the other policy officers (even in environment) don't know of its existence."

"DCNA and DCBD are hidden to newcomers [tourists and researchers], and need a higher public profile – not knowing...[these local science networks]...as a newcomer cost me 2-3 years of really productive work"

Existing users are well-positioned to help leverage growth in public awareness and dissemination. A relatively high percentage of respondents have jobs that include engagement with local islanders and tourists (33%), which can be leveraged to improve awareness and dissemination of DCBD. Several respondents indicated that they already provide DCBD weblinks in their engagement with local communities and dive schools. This is an important opportunity as indications are that face-to-face engagement with islanders is very important in information exchange. Several respondents recommended linking with their existing social media communications, such as providing a link to DCBD in their news articles. In addition, many respondents recommended that DCBD is more closely linked to the DCNA website and its monthly BioNews article.

"DCDB could better use existing links with DCNA, especially through their monthly BioNews articles"

"Social media outreach through Facebook is a major platform to engage with local communities – we use it every month and tag interest groups – we should investigate including links to DCBD where information exists"

A structured maintenance and update plan is required. This is important to continuously evolve DCBD as well as meet its requirements as a data rescue facility. While local facilitation of information exchange through DCNA was acknowledged by most respondents as extremely important, the use of DCNA is currently under-utilized, as the majority use WUR to upload information. None of the respondents upload their own information, although at least two recipients specifically indicated that they would like to upload their own information.

"Need an active maintenance procedure, and at moment it feels like it is a bit ad hoc …..The effort to maintain a good database is underestimated"

Technical challenges highlighted by the respondents were mainly around the website search function and language access. Overall, the new website interface was regarded as is clear and professional, with 72% of respondents noting it as easy to use despite technical challenges around searching for documents. The main issues were associated with the search function and organisation of the website content.

"Everything is on there – it just takes time to find the right search"

"It takes time to weed out information"

"The monitoring indicators need to be ordered somehow....even alphabetic would be an improvement to the current way of presenting them"

Key recommendations

Maintenance, updates and user-friendliness of website: DCBD has evolved and been adapted over the last decade based on user needs (Verweij et al. 2019). From this survey, some further website design needs can be addressed, including: reconfiguring the filters on the search tool, potential re-organisation of the monitoring data into clusters (e.g. species, ecosystems pressures; or according to realm), improving links between the DCBD and DCNA website, broadening links to regional information platforms. Explicit resources for supporting the collation and dissemination of information should also be made available.

Systematic development of monitoring indicators and factsheets to support policy and decision making. The DCBD was not designed as a monitoring and reporting tool, or a tool for making environmental decisions. However, it has had the benefit of a decade of data collation, which has allowed some synthesis of trends on the state of biodiversity and the pressures that may drive biodiversity decline. DCBD could strengthen its support to environment and nature policy by systematically identifying the priority data required in (1) national and local policy reporting and (2) local environmental decision making, and aiming to fill gaps in this in the coming decade. Developing factsheets to accompany existing and future monitoring indicators is also a powerful means of communicating the societal relevance of the trends that are being tracked, and the range of potential policy and management interventions that could be put in place to enhance positive outcomes for nature and people. The development of monitoring indicators needs to involve the scientists who were responsible for the original data collection, statisticians, scientists doing national and global policy reporting on indicators, and policy advisors. This will help to promote indicators and factsheets that are policy-relevant, easy to interpret, but that are also scientifically robust and convey confidence levels. A common 'look and feel' for graphs and factsheets could be an advantage, and could be shared between both DCBD and DCNA websites.

Broaden the awareness and dissemination of DCBD to local communities and policy and science audience: The DCBD serves many users in the nature sector and there is a widespread agreement among its users that it is now time to extend these services beyond the nature sector in an effort to enable a more nature-inclusive approach to development decisions. This will require deciding on the target policy audiences, understanding their needs, and developing ways to respond to these needs. This evaluation also indicates potential demand from local scientists on the island to interact with and learn more from each other, as well as with those charged with developing and implementing environmental policy on the island. This highlights a potential opportunity for DCBD to be embedded in a community of practice, in which people supplying and using information can be mobilised to coordinate their actions around sustainable island development. Co-developing research and data strategies with such a community of practice offers a powerful potential to supply information and data that supports nature inclusive planning and transitions.

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Introduction

The Dutch Caribbean Biodiversity Database (DCBD; www.dcbd.nl) is a nature and biodiversity web-platform for the Dutch Caribbean funded by the Dutch Ministry of Agriculture, Nature and Food Quality (LNV). It was initiated in 2010 as a central knowledge store, and its original intent was primarily around guaranteeing long-term data availability in an environment that experiences a high turnover in project funds and personnel (i.e. essentially as a data rescue tool), with five broad priorities to guide its development (Box 1).

The DCBD has been in existence for a decade now. It allows users to assess the status of ecosystems, species, threats and pressures; to explore spatial data on biophysical, socio-economic, ecological and topographical properties; to navigate a listing of biodiversity and ecosystem-based information portals; and to search in a library for reports, journal articles, documents and raw data. A selection of the data and accompanying references on DCBD have also been synthesised and developed into indicator catalogues for management and policy making, which can inform reporting obligations based on (inter)national treaties, such as the Convention on Biological Diversity (CBD). The scope of the DCBD has therefore broadened as one initially intended primarily for data rescue to one that now provides a platform situated at the policy-science interface: for policy making on nature management and spatial planning decisions, and for science in exchange of research information.

The aim of this project is to evaluate the existing DCBD given this evolution to changing circumstances, with a view to understanding strategic directions for its future development. We evaluate user perspectives on:

- Its use, organization and dissemination of information

- Potential gaps in content, particularly for policy making application

- Potential future needs.

> **Box 1: Original aim and priorities guiding DCBD development** (Verweij et al. 2019)
>
> The original aim of the DCBD was primarily to guarantee long-term data availability in an environment that experiences a high turnover in project funds and personnel (i.e. essentially as a data rescue tool). The initial development of the DCBD was based on five priorities that were scoped with nature policy makers and scientists at the time:
>
> 1. Upload observation data in a well-structured and pre-defined data-entry-form, and download for a restricted set of users.
> 2. Share and search documents.
> 3. Display of GIS maps as a background for observation data (observations only visible for restricted set of users).
> 4. Display encyclopaedic information that cannot be found on general purpose websites like Wikipedia (with possible links to specific web-portals, e.g. Reefbase.org and fishbase.org).
> 5. Include a professional and high quality design.

The report below first describes the stakeholder base of the current DCBD. It then describes the methods used to elicit user perspectives, via the website visitor statistics and a survey of a representative sub-set of the DCBD stakeholders. The results section outlines website visitor statistics and respondent perspectives on current needs and uses, and future perspectives. The report concludes with an assessment of DCBD relative to its original priorities, and some key findings and recommendations on the way forward for its development.

DCBD stakeholders

A comprehensive stakeholder database of all known DCDB stakeholders was collated, which included both DCBD users as well as those involved in the conceptualisation and development of the DCBD. The stakeholder database currently consists of 55 stakeholders representing 23 organisations that are referenced in Table 1. Together these stakeholders represent organisations drawn from research, government, civil society and private sectors (Figure 1).

Table 1: Organisations represented in the DCBD stakeholder database. Surveys were conducted with staff of institutions marked with an asterisk.

|	Institution name
1	Carmabi
2	CBS Statitsics Bureau
3	Caribbean Netherlands Science Institute (CNSI)*
4	Dive shop
5	Dutch Carribean Nature Alliance (DCNA)*
6	Echo
7	Indiana University*
8	Ministerie van Landbouw, Natuur en Voedselkwaliteit*
9	Naturalis
10	Observado
11	Ruimtelijke Ordening Bonaire*
12	Private Consultant*
13	Ravon
14	Rijksdienst Caribisch Nederland*
15	Saba Conservation Foundation
16	Sea Turtle Conservation Bonaire (STCB)
17	St Eustatius Tourism Development Foundation
18	St Martin Nature Foundation (SNF)
19	Stinapa*
20	Waarnemend regeringscommissaris St. Eustatius
21	Wageningen University Research*
22	WAITT Institute
23	Worldwide Fund for Nature*
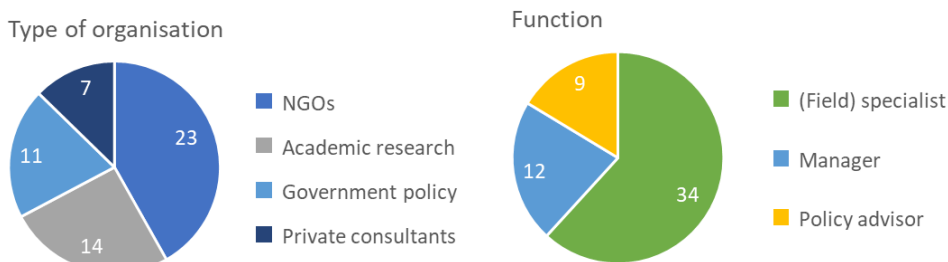
Figure 1: Representation of the DCBD stakeholder database by type of organization and the function of the individual

Methods

Summary statistics of website visits were extracted to give a broad indication of the types of information visitors were using. Semi-structured interviews with a representative set of DCBD stakeholders provided a more detailed understanding of user perspectives.

Website visit statistics

We used the Matomo website analytics (https://matomo.org/) to download statistics on visitor hits on the DCBD website. These data have only been collected since 2018. We extracted the number of visits, the region of origin, and the web pages visited to give an indication of the use of the new DCBD website.

Stakeholder surveys

Semi-structured interviews provide a level of standardisation while still allowing the interviewees to articulate their own values and framings (Thomas 2011). The survey guide consisted of 21 open-ended survey questions (Appendix 1), which were divided into four parts:

- General information on the profile of the respondent
- Their job context in relation to DCBD
- Their current use of DCBD
- Their perspectives on improvements for future use of DCBD

Stakeholder interviews were conducted by the lead author with individual respondents between August and December 2019. Stakeholders on the database were emailed, and from this eighteen stakeholders – across 11 organizations (Table 1) – consented to the interview. The first interview was conducted face-to-face with a user of DCBD who had agreed to test the survey. All other interviews were conducted by telephone or skype, and lasted approximately 30 minutes to one hour. An ethical code of conduct was followed in which respondents were informed of: the project aim and how the anonymised information would be used; the ability to skip questions without the need to explain; the ability to withdraw their perspective prior to the end of the project without the need to explain; and the ability to request not to be quoted even though anonymously.

Stakeholder responses were typed directly into the survey form during the interview (no voice recordings were made). The interview forms were coded in excel, deriving categories from the data in an inductive process. The lead author did all the coding which facilitates consistency. Summary statistics on the categories were drawn from excel, and supported by anonymized information and quotes from the interview forms.

Results

Perspectives on the new website design of DCBD

The DCBD website underwent some an extensive new design in the middle of 2019. Approximately half of the respondents had used the new website before the interview. All of them indicated it was an improvement from the previous website, except two respondents – one respondent preferred the old website, and the other had mixed feelings on the new website. The users who had used the new website commented that the filters that now exist improve the searching, but some challenges still remain (see changes suggested for search function under future uses). Specific quotes on this included:

"The main page is better than before, more professional and layout is simple and clear"

"The additional filters of new website improves search function"

"The select by island location using icons is a nice feature"

"Viewing the mapped data before you download it is a very nice feature"

"..requires too much scrolling - information should be immediately apparent on the landing page"

Summary of website visits

In both 2018 and 2019, the statistics around visitor use of DCBD remained stable (Figure 2). There were approximately 11,000 visits, of which the majority of hits came from Europe and North America, with also with a relatively high proportion of the hits from the Dutch Caribbean islands (Figure 2). Since 2018, there has been a small increase (5%) in the number of central American visitors at the expense of European visitors.

The visiting activity focuses 47% on publications, reports, media articles and raw data, 36% on maps, 16% on monitoring indicators and 1% on accessing related information web portals.

The most common visits are made from search engines such as Google (75%), with 22% of the visits coming directly via the DCBD website (22%) or hard links from other websites (3%). No conscious effort has been made to engage visitors via social media, which is also evident from the very low number of visits via that channel (1%).DCBD is visited on desktop (63%), smart phone (29%) and tablet (8%). There is a shift of about 10% to smart phone at the expense of desktop compared to 2018. The upgrading of the website design in 2019 also greatly improved its user-friendliness for smart phone.
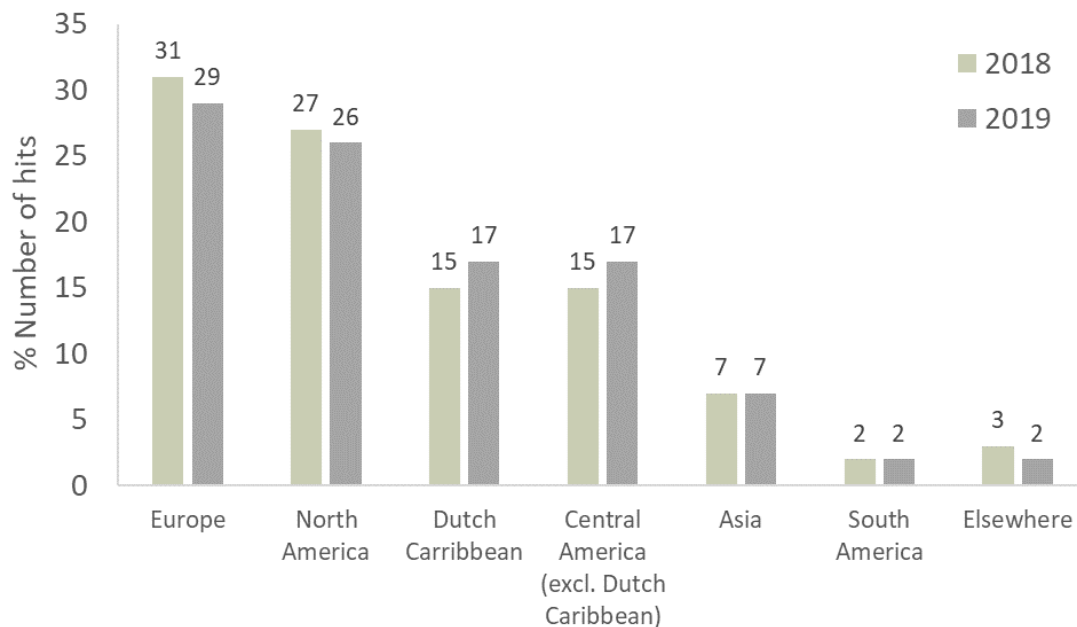
Figure 2: Number of visitor hits per region (n=11,000). Central America includes Mexico, Colombia, Venezuela, the whole of the Caribbean and the Guyanas.

Profile of respondents

Most respondents were between the age of 30-60 (67%), with a male-dominated gender ratio (61%) (Figure 3). Respondents were mainly Dutch Europeans (61%), with Dutch Caribbean respondents comprising only 22% of the respondents (this includes those born in the Dutch Caribbean and those who have lived there for 10+ years and identify themselves as an islander). Even though not targeted, an encouraging number of early-career scientists responded (39%; those with < 10 years' experience). All respondents had a tertiary education., and these were all related to environmental sciences, except for two respondents who both held Bachelor's degrees. Most respondents (56%) have not restricted their professional activities to a specific realm, but are rather guided by environmental issues at hand. Nevertheless, there was a slight bias towards the marine/coastal realm (Figure 3).

The 11 organisations from which the respondents were drawn represent a moderately even spread of organisational functions (academic, government, non-governmental organisations (NGOs) and private consultants), with a slight bias towards academic research (Figure 4).
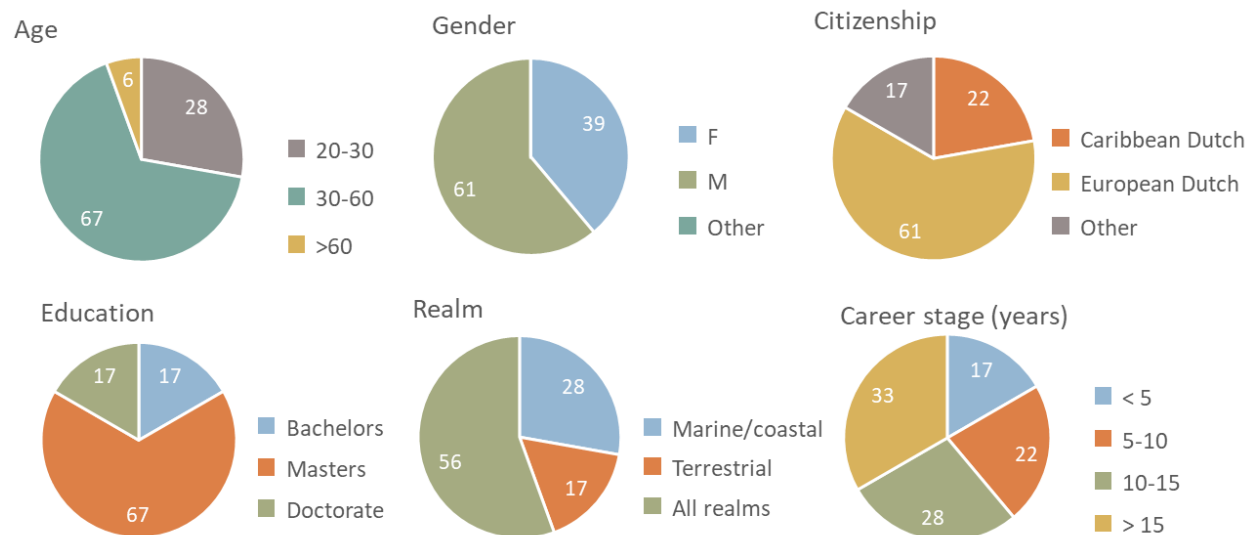
Figure 3: Profile of respondents. Numbers in white text are the percentage of total respondents (n=18).
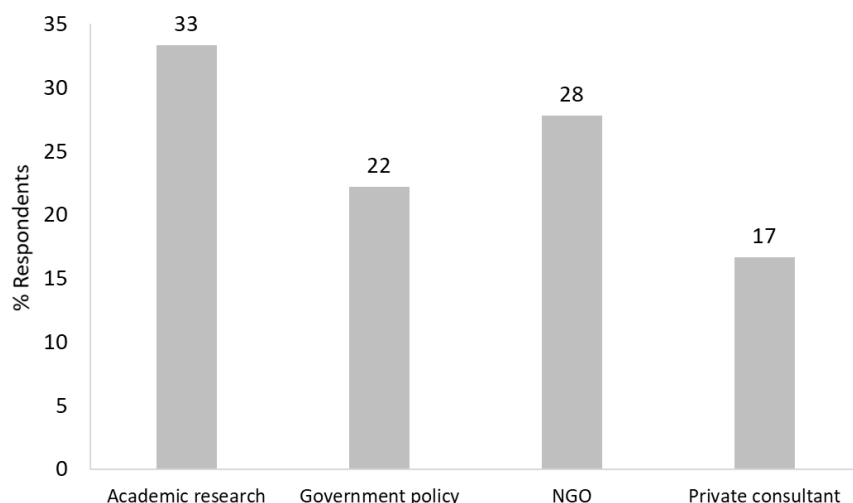
Figure 4: Representation of respondents across organisations and level of seniority (n=18).

Job functions and information sharing

Four respondents (2 local, 2 not) expressed a concern that DCBD may serve global and national interests more than local, and so we were attentive to get representation of local perspectives compared to global and national user perspectives. There was a relatively even spread among the respondents between those having mandates with a local management focus (47%), and those having global or national mandates (53%) (Figure 5). At the local level, we noted that there is a relatively high percentage of respondents who have jobs that include engaging with local citizens.

Figure 5: Job functions of respondents (n=18).

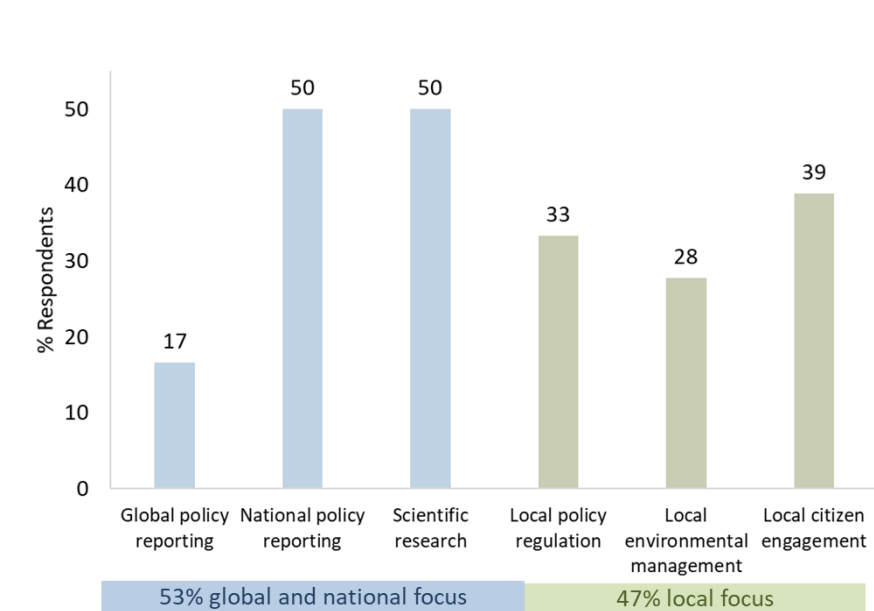Information is sourced mainly from technical reports and science publications, with 32% of respondents indicating that this conventional form of science information exchange is still extremely important in their job because it offers scientifically credible evidence (Figure 6). Websites were next most commonly cited information source (28%), and these were particularly used for accessing citizen science platforms, which respondents viewed as an emerging robust evidence base to explore. The most frequently mentioned citizen science platforms were: Ocean conservancy (coastalcleanupdata.org); Reef.org; Widecast Foundation (sea turtles) and Observado. The 26% of respondents that indicated they use primary data (Figure 6) tend to source data directly from primary data collectors through their island networks, rather than go through the DCBD data request filter.

Information is shared through a variety of sources (Figure 6). Conventional forms of information sharing are still the most common, with respondents indicating a relatively even balance between the use of: face-to-face conferences and meetings (22%), technical reports and science papers (20%), traditional media (press and newsletters) (20%). BioNews, a monthly news article published by the Dutch Caribbean Nature Alliance (DCNA) was frequently mentioned in this last category. Social media was emphasized by some of the respondents (12%) as an increasingly important form of knowledge exchange, with the island having a very active Facebook community.
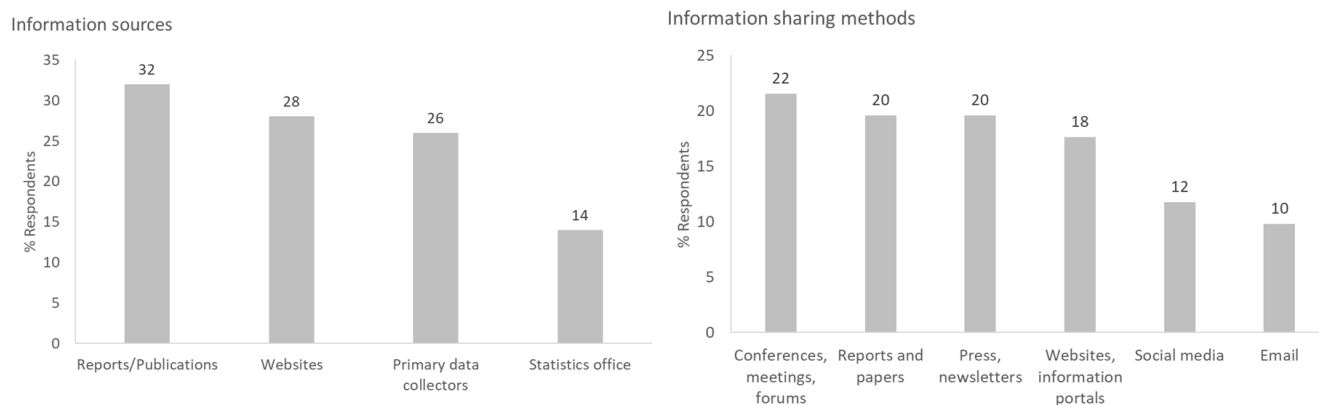
Figure 6: Information currently used by respondents and ways of disseminating their results (n=18).

Current use of DCBD by respondents

Extent of use

Of the 18 respondents, four indicated that they had insufficient experience to answer the section of the survey on current use. This was either because they supervised others who dealt directly with the DCBD or were very new to the DCBD and had not used it sufficiently.

Among the respondents, there was an equal percentage of new (< 5 years) and experienced (10 years) users, indicating an encouraging 'pipeline' of new users coming through (Figure 7). Respondents reported that the frequency of their use of DCBD over the year was highly variable, depending on the task at hand, with 33% indicating weekly use; 34% monthly or quarterly use and 22% yearly use (Figure 7). Most respondents use of the DCBD was limited in duration, focusing on targeted information that they were looking to download (Figure 7): *"I have very targeted use – I get in download and get out".*
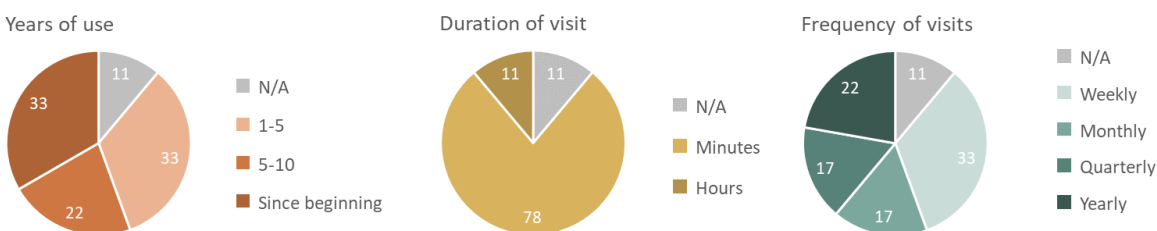

Figure 7: Extent of use by respondents (n=18). N/A indicates respondents that did not feel they had sufficient experience with DCBD to answer the 'current use' section of the interview. Numbers in white text in the pie chart are the percentage of total respondents.

Types of use

A wide variety of uses were reported which could be grouped broadly into accessing information, sharing information and data rescue (Figure 8):

- *Accessing information*: Over half of the respondents use DCBD to access already-synthesized indicator data (61%) and reports and publications for the Dutch Caribbean (50%). Respondents indicated that their interest was more focused on reports and grey literature that they cannot find via websites elsewhere, e.g. student theses. Some 44% use DCBD to access and download data, and this is mainly synthesised data – those that require primary data generally obtain it directly from the data collector, whom they know through the island networks. Fewer respondents than expected (28%) use the analysis and mapping tool. Some respondents(16%) indicated that they currently do not use the tool because it requires software installation, which their organisations forbid. The remaining, respondents are more GIS-enabled and merely download the data layers and use their own tools.

- *Sharing information*: Use of DCBD as an information exchange platform was high, with 78% of the respondents reporting that they supply information to DCBD – 28% of whom said they also check to see that the information they know of is on the DCBD. Half of the respondents report using the DCBD specifically as an information sharing portal that provides a website link for colleagues to access reports and scientific papers (22%) or to the broader public to access the indicator trends (28%). The DCBD is also used to learn about new research on the island (33%).

- *Data rescue*: The DCBD provides an extremely important data repository for at least 17% of the respondents: "*If we have a fire, or files get lost, we don't have back up. I feel good knowing that our data that we have spent a lot of time collecting is stored somewhere else too*".
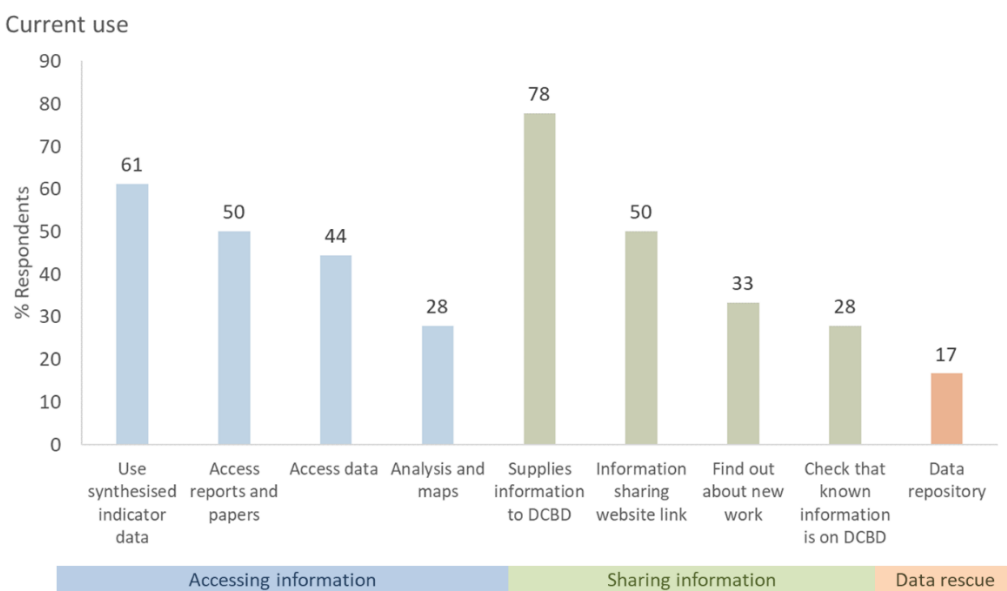

Figure 8: Types of use described by the respondents (n=18).

Preferences for primary versus synthesised data

Thirty-nine percent of respondents prefer to use primary data over synthesised, which they source from the data collector directly (Figure 9). As could be expected, respondent preferences on data synthesis was dependent on their function: academic researchers mainly prefer primary data; policy advisors prefer synthesised data; consultants on projects use both, depending on the task at hand. The majority of DCBD data downloads require permission from the data collector, and most users tend to circumvent this route and do it through their own networks. While the primary data is often obtained direct from the source outside of the DCBD, the synthesised data made available on the DCBD is highly valued: "*I am a user not an analyser – there are no other synthesis places where I can go*".
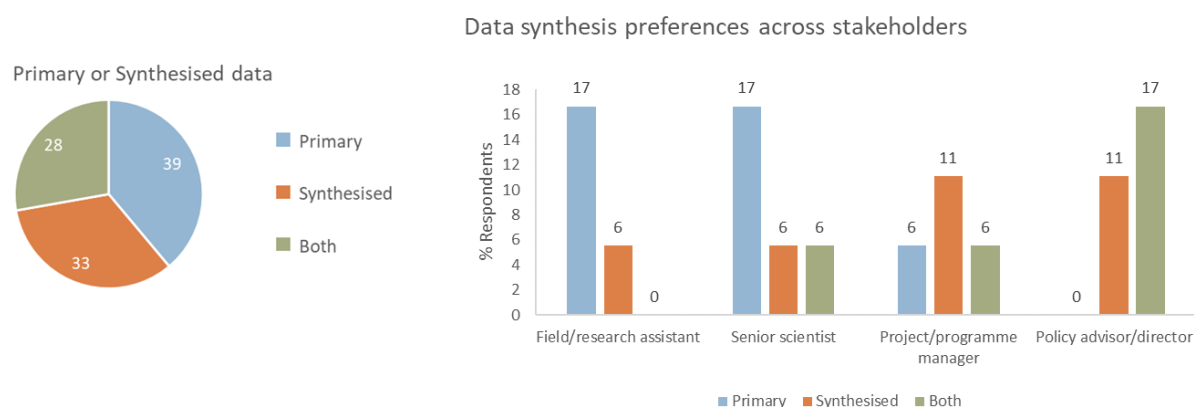

Figure 9: Data synthesis preferences across stakeholders (n=18). N/A indicates respondents that did not feel they had sufficient experience with DCBD to answer the 'current use' section of the interview. Numbers in white text in the pie chart are the percentage of total respondents.

Ease of use and exchange

Most respondents indicated that DCBD is easy to use (44%) (Figure 10). Only 11% found it difficult and this was mainly associated with issues around searching for documents. Indeed, the searching tool was also responsible for most of the respondents who indicated 'it depends' in terms of ease of use (Figure 10).

The majority of respondents (66%) understand that the process for uploading information at present is to give the information to Wageningen University Research (WUR) or to the DCNA (Figure 10). While local facilitation of information exchange through DCNA was acknowledged by most respondents as extremely important, the use of DCNA is currently under-utilized, as the majority use WUR to upload information. None of the respondents upload their own information, although at least two recipients specifically indicated that they would like to upload their own information.
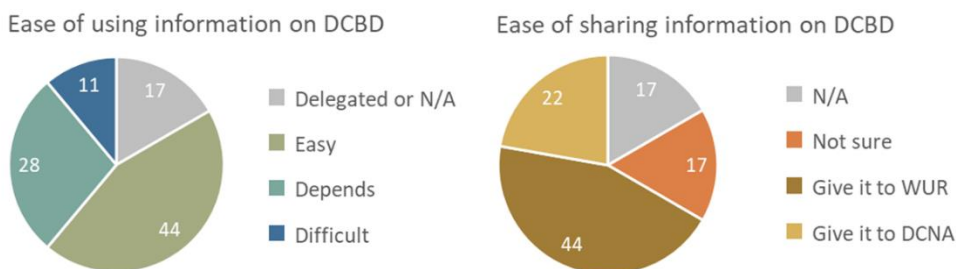
Figure 10: Ease of use and information exchange of DCBD. N/A indicates respondents that did not feel they had sufficient experience with DCBD to answer the 'current use' section of the interview. Numbers in white text are the percentage of total respondents (n=18).

Future suggestions regarding DCBD

Views on receiving notifications of new information

We specifically asked respondents their views on receiving notifications of new information on DCBD via email, and their views on broadening the spatial content of the DCBD to beyond the Dutch Caribbean (regional or global). We did this because there were indications in our first few interviews that there may be demand for this.

The vast majority of respondents were in favour of receiving emails of new information on DCBD (Figure 11). Those who indicated that it depends gave the following conditions: only if it is once a month; only if there is an unsubscribe button; or only if they could select topics of interest to them. Those not in favour indicated that they prefer the news items to be advertised in BioNews. An additional point was raised to have notifications that remind people to put information *onto* the DCBD.
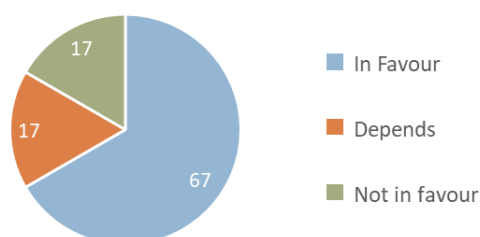
Figure 11: Views on receiving notifications of new information on DCBD via email. Numbers in white text are the percentage of total respondents (n=18).

Views on broadening the spatial scope beyond the Dutch Caribbean

All respondents felt that global linkages were better covered elsewhere. Most of the respondents (83%) felt that the local specificity of the DCDB was its main strength, or that it should only be broadened where there were implementation dependencies at a regional level, such as for Ramsar sites for migratory birds, sharks, rays, Caribbean hotspots connected to areas where there are strong external pressures/threats

(e.g. pressures from abroad on Saba). There also were a few respondents who felt regional linkages could be strengthened in connection with learning together (e.g. in terms of invasive alien species), and providing a more coordinated regional input into global policy processes such as Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).
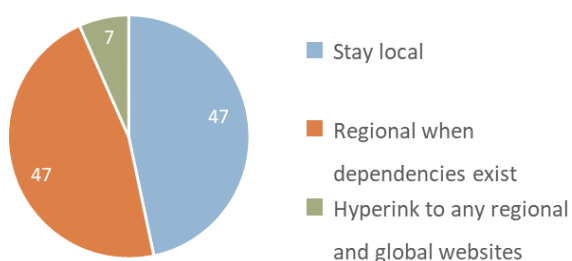
Figure 12: Views on broadening the spatial scope of DCBD beyond the Dutch Caribbean. Numbers in white text are the percentage of total respondents (n=18).

Suggestions regarding future potential scope

Suggestions regarding future potential scope were mainly focused on growing the awareness and dissemination capacity of the DCBD (Figure 13). Only 13% of the respondents suggested broadening the content. Content changes were mentioned as another strategic direction of DCBD (Figure 13), and this mainly focused on developing DCBD's monitoring indicators further to address policy needs (Table 2).

Figure 13: Suggested changes highlighted by respondents (n=18).

Suggestions regarding technical maintenance

Suggestions regarding technical maintenance were mainly related to ensuring regular updating and quality control (Figure 13). Other technical maintenance suggestions were around improving the user friendliness of the website to address challenges with the search function challenges, website organization, language access and access to mapping tools (Table 2).

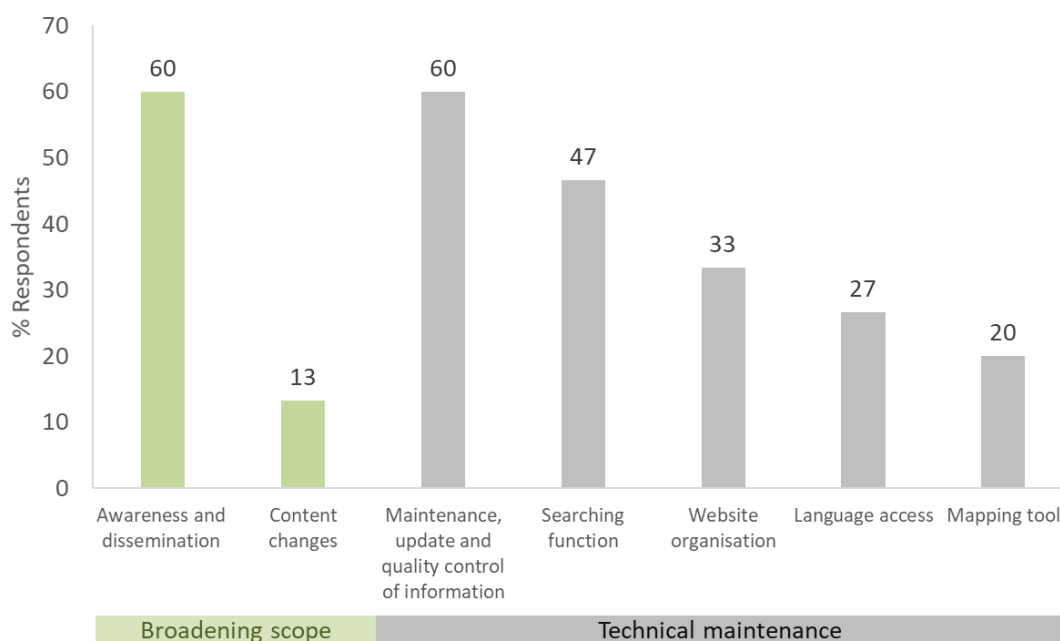The search function and website organisation challenges were most-frequently mentioned (Figure 13), and the challenges around both of these were both related to the current website filters. There are three filters (data type, geographic location and theme). For the 'data type' filter, it is not possible to search across all 'data type' options at present (e.g. book, portal, scientific article, maps and charts, media, research report). The geographic location filter (which allows searching for information specific to one island) was highly appreciated, but a question arose on how to deal with the Dutch Caribbean Exclusive Economic Zone, which does not belong to a particular island. For the 'theme' filter, respondents differed around the suggestions on how to organise particular themes. Currently the themes are organised according to four topics: governance, education and outreach, legislation, and research and monitoring. Most respondents suggested realms would be more helpful.

It is also unclear how articles in different languages get treated in searching, which is especially a problem when trying to move seamlessly between local language, Dutch and English.

Table 2: Details of issues and/or suggestions by the respondents regarding future use and direction of the DCBD

Type of change	Specific suggestions

Awareness and dissemination	BROADENING POLICY AND SCIENCE AUDIENCE
	• A local authority needs to be clearly assigned and very project should be registered with a local authority
	• The local DCNA office is critical to knowing who is working on what on the island (this comes from stakeholders other than DCNA)
	• DCNA and DCBD are hidden to newcomers (tourists and researchers). Only STINAPA has visibility –the signs newcomers see are STINAPA's, and it is this name on the diving tags.
	• DCDB needs to send out reminders of new information on DCBD as well as 6-monthly reminders to regular suppliers to put data onto DCBD.
	• Need to provide a space for facilitating data suppliers to provide their data.
	    • Indications are that it is more effective to do this face-to-face, but the effectiveness of a space hosted physically in Bonaire (e.g. DCNA offices) and virtual meetings with WUR should also be investigated.
	• Strengthening awareness in regional and global policy processes (e.g. Caribbean, IPBES).
	
	BROADENING TO LOCAL COMMUNITIES
	• Care should be taken to present the evidence base rather than advocate a particular viewpoint.
	• Social media outreach through Facebook seems a major platform to engage with local communities
	    • DCNA, RCN, STINAPA all use Facebook on at least a monthly basis and tag interest groups;
	    • DCDB could better use existing links with DCNA, especially through their monthly BioNews articles;
	    • DCDB could also explore using the RCN Facebook page as a regular outreach platform.
	• Making stronger links with citizen science programmes.
	• Translating to local languages would improve local access, even if it is only the landing page.

Content changes	• Suggestions on the content of the DCBD focussed on moving forward to strategically address policy needs
	• They included:
	    • Broadening the suite of pressure indicators to be responsive to global and national reporting requirements. These should be more systematically thought out than the current list.
	    • Address national nature monitoring framework needs as a priority.
	    • Broadening beyond the nature sector, e.g. adding in fisheries and agriculture data.
	    • Striving for excel-based searchable, re-usable data.

Searching function	• 47% of the respondents reported challenges using the searching tool on DCBD • It is difficult to distinguish between the data types (e.g. manual, report) and there needs to be an option to select "All" data types • Not clear how to search for the range of different languages the reports covers, especially between Dutch and English. • When you search for reports, you get a really long list; search filters that now exist on new website may be good to filter this. However, there are challenges on how to arrange the filters. • For the search filters, the themes are not relevant (would rather have them arranged according to realm or topic such as agriculture, tourism, fisheries, coral reefs, mangroves etc). • The Search function returns only the name of the report and there is no indication of the topic - it would be good if the reports were sensibly grouped according to topic.
Website organisation	• 33% of the respondents had issues with the way information was organized on the DCBD, although some acknowledged that the diversity of information and interests was a challenge to how it could be organised.

Type of change	Specific suggestions
	• The point around improving the organization of the website content was most frequently raised in connection with monitoring indicators. Respondents in this instance felt that it would be more logical to arrange the indicators according to a hierarchy (e.g. per realm, per taxonomic group, per issue, or even alphabetically). • The search by island function was appreciated by several respondents, but a point was raised to add a similar means of searching for information in the EEZ. • A suggestion was made to bring back the colour logos of sponsors instead of the black and white, which are less prominent. Also, to check if all the logos are on – there seem to be some missing.
Language access	• Translating to local languages would improve local access, even if it is only the landing page. • Search function needs to consider how to deal with searching for information in different languages.

Maintenance, update of information and quality control	• Spatial data needs more regular updating.
	• A structured process for collecting data and putting it onto DCBD was suggested by suppliers/potential suppliers of data that would like the space to add their data but don't get a chance to do this in busy work life.
	• Need to investigate how to collate data on a regular basis without having to send people from Europe to the Dutch Caribbean each time
	• Investigate the potential of having sessions that support a physical hosting centre at DCNA and virtual participants in Europe
	• 33% of respondents expressed concern over quality control and scientific robustness of data, especially about using data without knowing its limitations and confidence.
	• The data request filter ensures that requestor has contact with the original collector, which can help to ensure that the data are used correctly. Scientists like this. Policy advisors are frustrated about the conditional step.
	• One respondent suggested that a 'Wikipedia type' citizen review may help.
	• When it comes to the DCBD indicators, there is a tension to be managed between ensuring scientific robustness and meeting policy needs:
	   • Policy makers have a strong demand for pragmatic, easy to interpret indicators of the state of nature;
	   • Scientists emphasize danger of generalities and are concerned of over-simplifying the complexity of nature;
	   • It is clear that indicators need to be jointly defined and analysed to ensure that they meet the needs of policy, while conveying the confidence levels of the data.

Mapping tool	• The suggestions for the mapping tool need to be viewed in the light that only 28% of the DCBD users use the mapping tool, despite many more indicating that they download spatial data. • The mapping tool was mostly used by policy officers. Scientists generally downloaded the data layers and used them in GIS software. • To provide for use by policy officers it is necessary to have inbuilt, web-based tools for mapping because government laptops do not allow the installation of GIS software • The mapping tool should help to customise choices such as deciding on map categories – currently, the DCBD map legends are very disaggregated, and it is difficult to see the colour distinction on the maps. • Only a small proportion of the GIS data are available to visualise on DCBD and it is unclear why this is the case.

Other suggestions	• Undertake a review of the grey literature to understand the extent of the information on the Dutch Caribbean that is not on DCBD
	• Several early career scientists on the islands expressed the need for capacity development in terms of:
	   • Training on how to generate trends and statistics on their own data;
	   • Connecting to scientists that monitor trends in nature.
	• Do a Wordle on the text from the interviews to see priority discussion points.
	• Help to engage with CBS around disaggregation of some of their data to more appropriate levels for Dutch Caribbean. The issue here is not retaining anonymity but more about the work it involves to customise methodologies for the island, compared to using generic methods developed for the Netherlands.

Discussion

Evolution from original intent of DCBD

The DCBD has evolved to fulfil its overall aim of data rescue, and to address the original priorities to provide: an avenue for knowledge exchange (particularly for local island information not found on more generic websites); a map visualisation tool; and a professional website design (Box 1). This can be illustrated by the following indicative quotes:

> *"I like to use the synthesis on DCBD to show people the data and how it is used; the monitoring indicators and maps are really nice - I can click on the links and see straight away"*

> *"Without DCBD we would not have a backup facility for the data we collect"*

> *"Organisations are using the DCBD to show their organisations and audience the power of collecting data, analysing trends, and storing information in a central place"*

> *"I can provide people with the link to the website, not just show material"*

> *"The Parrots graph has been used to show that this is an issue and can create better awareness"*

> *"Provides communication for parliament, which can be made better with the [factsheets]"*

> *"The main page is better than before, more professional and layout is simple and clear"*

It is also illustrated by the fact that DCBD has an encouraging pipeline of new and experienced users, with 33% of the respondents having used DCBD for less than five years, a further 33% between five and ten years of experience, and 22% of the respondents having been part of its original scoping and development. This means that in addition to retaining the more experienced users, DCDB continues to attract a new user base.

In addition to fulfilling these original priorities, DCBD now also synthesises some of its data and information into policy-relevant monitoring indicators. This has been made possible because of the continuity of DCBD over the last decade, but it is done as a reactive exercise as and when new project information comes in. A more strategic approach to the development of monitoring indicators and factsheets would greatly enhance the utility of the DCBD for use in policy and decision making.

Conclusions: strategic direction of the DCBD

This evaluation has shown that DCBD has an active user base of both young and experienced DCBD users, is continuing to fulfil its original role from the previous decade and is already evolving as a tool for use in policy and decision making. Respondent surveys highlighted three priority areas for future maintenance and development of the DCBD.

Maintenance, updates and user-friendliness of website

To continue to grow and evolve the use of DCBD requires regular updating of news and information on the DCBD and attending to user-friendliness challenges highlighted by respondents, for which explicit resources should be made available. This should include activities to ensure regular updating of

information on DCBD (twice yearly), which should investigate the potential of hosting a meeting for data collection that combines physical and virtual participation. A more comprehensive and explicit protocol for collation of grey literature, including university programmes and resulting theses, should be developed and implemented to enhance the local strength of the website.

Improvements to the website friendliness include:

- Refining filters and search function, developing an option on the website for self-uploads;
- Providing a subscription to get news notifications by email;
- Re-organisation of the monitoring indicators into clusters (e.g. per species, pressures; or realm);
- Improving links between the DCBD and existing local community outreach platforms, especially through the DCNA;
- Broadening weblinks to regional information platforms; and
- More regular updates of the DCBD news items.

Systematic development of monitoring indicators and factsheets to support policy and decision making.

The DCBD was not designed as a monitoring and reporting tool, or a tool for making environmental decisions. However, it has had the benefit of a decade of data collation, which has allowed some synthesis of trends on the state of biodiversity and the pressures that may drive biodiversity decline. DCBD could strengthen its support to environment and nature policy by systematically identifying the priority data required in (1) national and local policy reporting and (2) local environmental decision making, and aiming to fill gaps in this in the coming decade. Developing factsheets to accompany existing and future monitoring indicators is also a powerful means of communicating the societal relevance of the trends that are being tracked, and the range of potential policy and management interventions that could be put in place to enhance positive outcomes for nature and people. The development of monitoring indicators needs to involve the scientists who were responsible for the original data collection, statisticians, scientists doing national and global policy reporting on indicators, and policy advisors. This will help to promote indicators and factsheets that are policy-relevant, easy to interpret, but that are also scientifically robust and convey confidence levels. A common 'look and feel' for graphs and factsheets could be an advantage, and could be shared between both DCBD and DCNA websites.

Broaden the awareness and dissemination of DCBD

The DCBD serves many users in the nature sector and there is a widespread agreement among its users that it is now time to extend these services beyond the nature sector in an effort to enable a more nature-inclusive approach to development decisions. This will require deciding on the target policy audiences, understanding their needs, and developing ways to respond to these needs. This evaluation also indicates potential demand from local scientists on the island to interact with and learn more from each other, as well as with those charged with developing and implementing environmental policy on the island. This highlights a potential opportunity for DCBD to be embedded in a community of practice, in which people

supplying and using information can be mobilised to coordinate their actions around sustainable island development. Co-developing research and data strategies with such a community of practice offers a powerful potential to supply information and data that supports nature inclusive planning and transitions.

References

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